vol. 1 no. 7

April, 1942

School Shop

FOR INDUSTRIAL ARTS & VOCATIONAL EDUCATION TEACHERS

You and Your Students Can Help Win the War

Electric Scoreboard
by Walter B. Weber

A New Feature: Shop Training for Victory

Youth Builds Mexico
by Pierce Shannon

Tested Projects • Instructional Resources • What Do You Think? Personalities • Washington Letter

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10" swing; 24" between centers • Bed 6 15/16" wide by 43 1/8" long • Prismatic V and flat ways, hand scraped and honed • New Departure precision pre-loaded ball bearing headstock spindle • Thread cutting, 4-216 per inch • 25/32" hole through spindle, 1/2" collet capacity • 12 spindle speeds, 30 to 1450 revolutions per minute.

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School Shop

FOR INDUSTRIAL ARTS & VOCATIONAL EDUCATION TEACHERS

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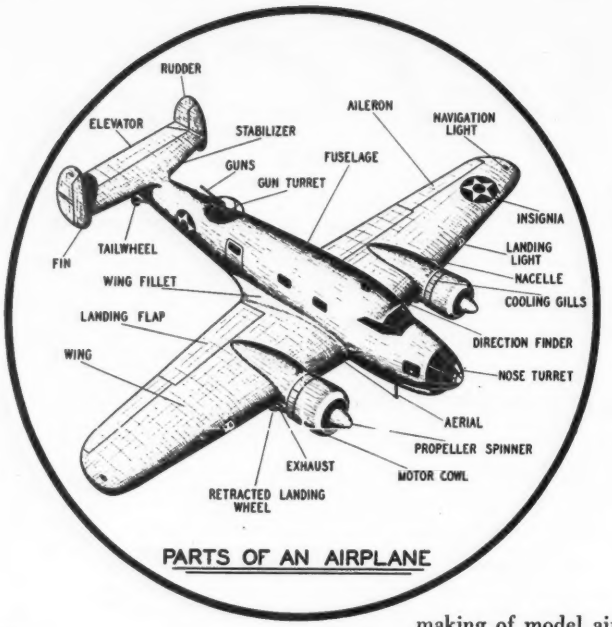


PARTS OF AN AIRPLANE

You and Your Students
CAN HELP WIN THE WAR

HERE IS THE CHANCE FOR INDUSTRIAL ARTS TEACHERS TO MAKE A DISTINCT CONTRIBUTION TO THE NATION'S WAR EFFORT, AT THE SAME TIME ADDING TIMELINESS TO THEIR WOODWORKING CLASSES

INDUSTRIAL arts teachers the country over are rushing full speed ahead toward completion of one of the schools' greatest contributions to the actual prosecution of the war: the making of 500,000 accurate scale models of Allied and Axis airplanes.

These planes, according to the Bureau of Aeronautics of the Navy Department, are to be used by both Army and Navy in training air and ground personnel in recognition, range estimation, and determination of "cones of fire." The plane models will also be used in training "spotters" for civilian defense. Each model will be an accurate reproduction in the scale of 1 to 72 of its counterpart among the 50 types of planes most commonly used in this war by both the United Nations and the enemy.

Co-sponsors of the project are the Navy Department and the U. S. Office of Education. The Office of Education has appointed in each state a director of the model-building program. This state director is in charge of appointing the local school directors who will immediately supervise the work done in their schools. Quotas have been determined for each state, to be apportioned among the schools of the state.

The schools were chosen to perform this vital task because they have the teachers, the students, and the tools wherewith to fill the order. And in addition it is felt that participation of students in this project will result in a number of educational values which could not be acquired in any other manner. For example, students will acquire skills and technical information in the making of model aircraft and will also be supplied with approved plans and specifications for a large number of different models not otherwise available.

School participation in this project should arouse, also, a great deal of interest on the part of parents, and should make the pupils feel that they are making a definite and distinct contribution to the war program.

Suitable recognition of student participation in this project will be made through granting of certificates of award by the Bureau of Aeronautics. Seven "aircraftsman" ratings will go to students who fulfill requirements for constructing approved plane models.

Extreme accuracy in the building of these models is emphasized by the Bureau of Aeronautics. The Bureau has prepared detailed plans for each type of plane to be modelled, as well as templates of the parts making up each plane. Only planes made with these plans and passing inspection of local inspectors will be accepted by the Navy. Time, too, is essential; hence the choice of the nation's industrial arts shops for the filling of the large order.

The Office of Education emphasizes that mass production in a limited number of communities is not what is wanted. It is more important to have each model individually made with extreme care and precision. Under no circumstance should a class be allowed to concentrate on turning out large numbers of the easiest types. Each student should try to make as many different types as he can with perfect accuracy.

The models are to be built of solid wood, using bass, poplar, pine, or other soft woods which can be easily worked. One inch on the model is to equal six feet on the actual plane. Wing spread on the several models will vary from six inches to two feet, with the majority of them less than a foot. As seen through a standard ring sight at a distance of 35 feet, the models will appear identical with the real plane just under a half-mile away. In addition to the wood, glue and paints will be needed; all materials are to be supplied locally. Each plane is to have two coats of clear lacquer, sanding between each coat, and a final coat of dull black lacquer. No insignia are to be used.

Despite the urgency of this project in promoting the war effort, it nevertheless can be integrated with the shop program, especially with the intense emphasis on aviation in the schools. Provision for related instruction can also be made, and the sponsors of the project encourage the formation of model airplane clubs for the building of actual flying models after the models for the Navy and Army have been completed in school shops.

Nearly every industrial arts teacher in the nation will be contacted by the director of the program in his state. Should a teacher not be called upon he is requested by the sponsors of the project to *address his state director,* and *not* to address either the Office of Education or the Bureau of Aeronautics.

Likewise, the sponsors ask individuals and crafts clubs wishing to contribute their skills to get in touch with the *local director* in their city. All plane models must be submitted to the local directors, who will send them, upon approval by the local inspection committee, to the proper Navy receiving center. *No plane*

will be accepted by the Navy that is submitted in any other way.

No comprehensive reports are asked for in connection with the project. States and local schools have been asked, however, to supply information on such items as number of schools, number of students, and number of teachers taking part, and the number of models shipped. The sponsors of the project would also like to receive evidence of community interest in the work, as shown in newspaper clippings, photographs, etc.

Plans for 40 of the 50 types of planes, have already been prepared by the Bureau of Aeronautics and sent on to the local directors of the project. The planes assigned to date are:

U. S. Navy: Brewster Fighter F2A (Buffalo); Brewster SB2A-1 (Buccaneer); Douglas TBD (Devastator); Vought-Sikorsky OS2U-1 (Kingfisher); Consolidated PBY-5 (Catalina); Consolidated PB2Y-3 (Coronado); Douglas SBD (Dauntless); Grumman F4F (Wildcat); Martin PBM (Mariner); Curtiss SOC-3; and Grumman J2F.

U. S. Army: Bell P-39 (Aircobra); Curtiss P-40 (Tomahawk); Northrop A-17-A; Douglas A-20-A (Havoc); Boeing B-17-E (Super Flying Fortress); Lockheed P-38 (Lightning); Martin B-26 (Maryland); Consolidated B-24 (Liberator); Republic P-43 (Lancer).

U. S. Commercial: Lockheed Lodestar; Douglas DC-3.

British: Spitfire; Wellington; Hawker Hurricane; Bristol Blenheim.

Russia: I-16 fighter.

German: Messerschmidt Me-110; Junkers Ju-87B; Junkers Ju-88A-1; Dornier Do-18; Messerschmidt 109; Heinkel 111.

Japanese: Mitsubishi Fighter 96; Kawasaki 97; Nakajima 95; Sento Ki-00-1; Baku Geki Ki; Mitsubishi 96.

Italian: Savoiia-Marchetti SM-82 (Cangaru).

Ten more types are to be announced in the near future. It is planned to build 10,000 models of each of these 50 types.

Remember:

Address your *state director* for plans and information regarding the project, not the Office of Education or the Bureau of Aeronautics.

Models made by individuals and clubs are to be sent to the local directors, where they *must be inspected, approved,* and sent on. Only the local director has instructions for shipping planes.

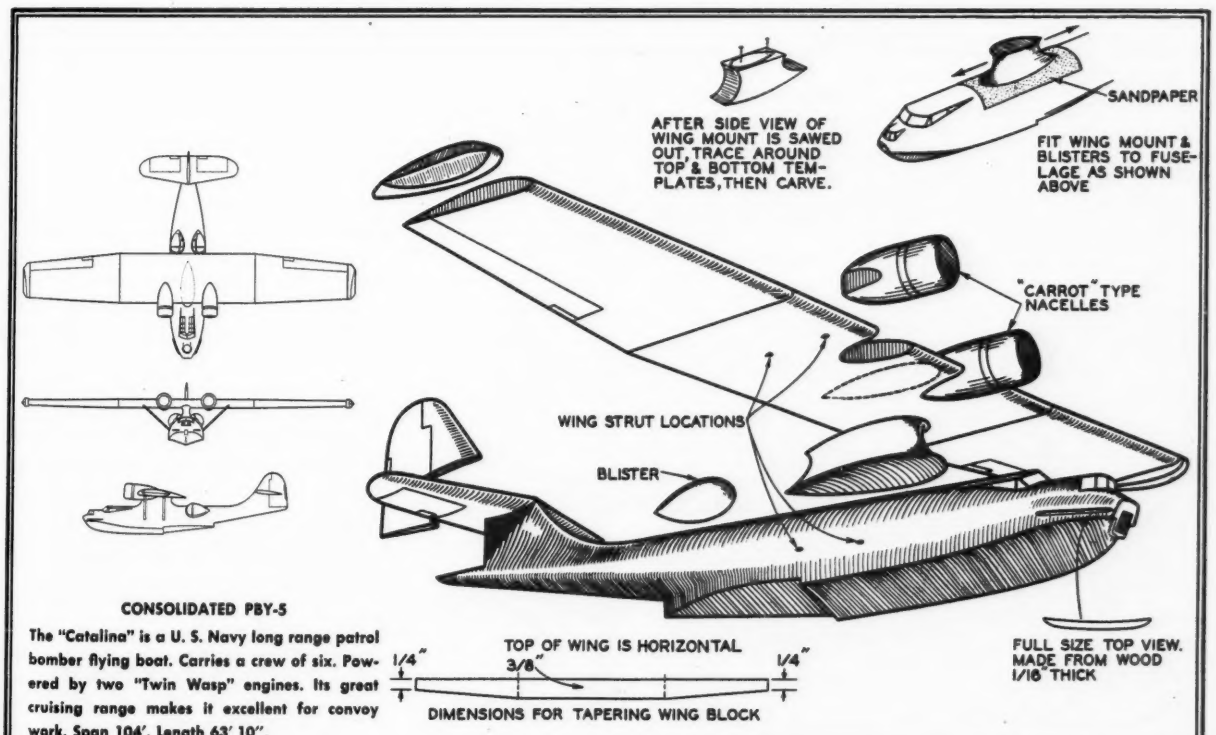
Models constructed according to plans *other* than those prepared by the *Bureau of Aeronautics* are not wanted and will be *refused* if submitted.

Model planes must be packed carefully because of the distances the planes must be transported.

Costs of materials used, and other expenses incident to the making of the models are to be borne by the schools or local organizations interested. The Navy will pay transportation costs upon receipt of planes.

Any number of models may be made from the plans supplied, and the plans may be copied if necessary. Extra planes may be used to exceed the quota, for display purposes, or for personal use of students.

Final-assembly drawings like this one, and actual-size templates for each part are furnished by the Bureau of Aeronautics for each type of plane to be made. All planes must be made from these plans.


AFTER SIDE VIEW OF WING MOUNT IS SAWED OUT, TRACE AROUND TOP & BOTTOM TEMPLATES, THEN CARVE.
SANDPAPER
FIT WING MOUNT & BLISTERS TO FUSELAGE AS SHOWN ABOVE
"CARROT" TYPE NACELLES
WING STRUT LOCATIONS
BLISTER
TOP OF WING IS HORIZONTAL
1/4"
3/8"
1/4"
DIMENSIONS FOR TAPERING WING BLOCK
FULL SIZE TOP VIEW. MADE FROM WOOD 1/16" THICK

CONSOLIDATED PBY-5

The "Catalina" is a U. S. Navy long range patrol bomber flying boat. Carries a crew of six. Powered by two "Twin Wasp" engines. Its great cruising range makes it excellent for convoy work. Span 104', Length 63' 10".

Identification

High-wing monoplane with wing mounted on pylon. Outer sections of wing are tapered to square tips (formed by retracted wing floats). Turtle-deck shaped hull with two steps. Each side of wing is braced to body by two parallel inclined struts.

BILL OF MATERIALS

Fuselage	.2x2¼x11
Wing	⅜x2½x16¾
Stabilizer	3/16x1½x5½
Fin	⅛x1¾x2
Nacelles	.2-1x1x2
Floats and Turrets	½x1x5
Wing Mount	¾x⅞x2½
Wing Struts	4-1 1/16x3/16x1⅞

MODEL — MODEL

CONSOLIDATED PBY-5

U.S. NAVY PATROL BOMBER

FINAL ASSEMBLY

SPAN 17-11/32"	SERIAL NO. A-6	DATE 2-16-42

U.S. NAVY **BUREAU OF AERONAUTICS** WASH., D.C.

Project of the Month:

Electric Scoreboard

• *by* WALTER B. WEBER

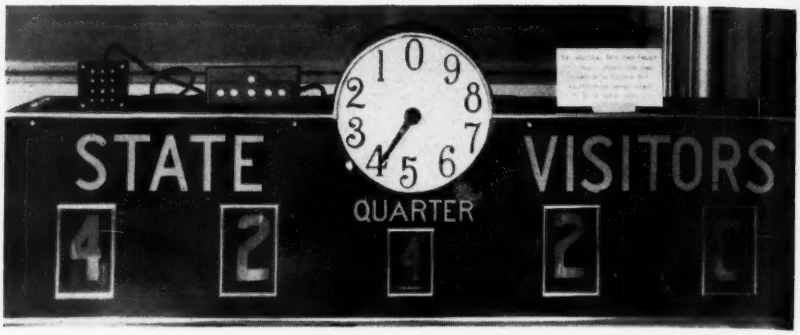


Figure 1

This scoreboard, besides being useful, calls for work in five different phases of shop work, as well as for a wealth of related information. Walter B. Weber teaches electricity at State Teachers College, Buffalo, N.Y. Complete working plans are available for this project from the author.

ENVY of school coaches in our area is an electrically operated basketball scoreboard built by the industrial arts department of State Teachers College at Buffalo, N.Y. Five years of troublefree operation attest the soundness of the experimental work and the accuracy of the construction going into the making of the scoreboard.

In addition to the value of the board to the athletic department of the college, there are great possibilities from the educational standpoint as well. From the description of the board which is to follow, it can be seen that manipulative work in the fields of wood- and metal-working, drafting, electricity, and finishing is required. Extensive use of related instructional material is called for, and the quantity and type of parts needed give excellent opportunity for the use of jigs and other production-type tools and operations.

While experimenting with this scoreboard, seven different types of board were designed, and actual working models made. The first consisted of a lens system with numbers painted on 35-mm. film. The expense of the 12 lenses required ruled this type out. The second model employed a full-size white cloth tape with numbers in black; lights were put behind each tape and a motor provided to drive it. The tape was found to stretch and the mechanism was not foolproof. The third model, having large circular discs with numbers cut out radially was too large to be used, as was the fourth, a large vertical drum with the figures on the circumference. A motor-driven arrangement with a common shaft for all drums was also discarded, since the numbers wouldn't always stop at the proper spot. The use of a large bank of lamps was also discarded because of the quantity of lamps and wire needed.

The seventh model was successful and constitutes the one described herewith. It is compact, inexpensive to operate, foolproof, reliable in operation, and is built in units each easily accessible for repairs and adjustment. In construction, emphasis was placed on the making of the parts as accurately as possible and on precision assembly—taking into account the equipment, tools, material, and human element involved.

Operation of the scoreboard is quite simple. As shown in figure 1, the board consists of six units, two for the scores of each team, one for the quarter, and

Figure 2

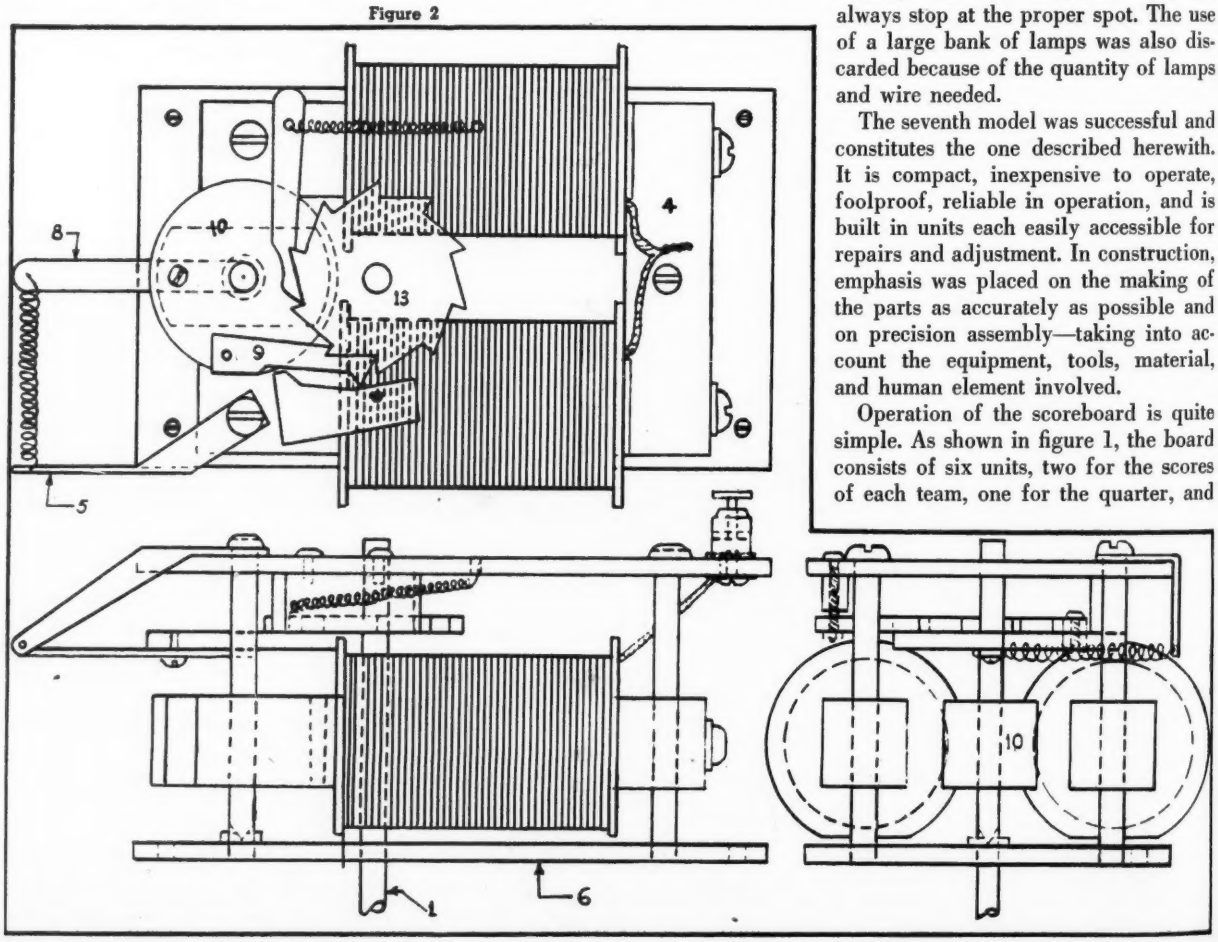


Figure 3

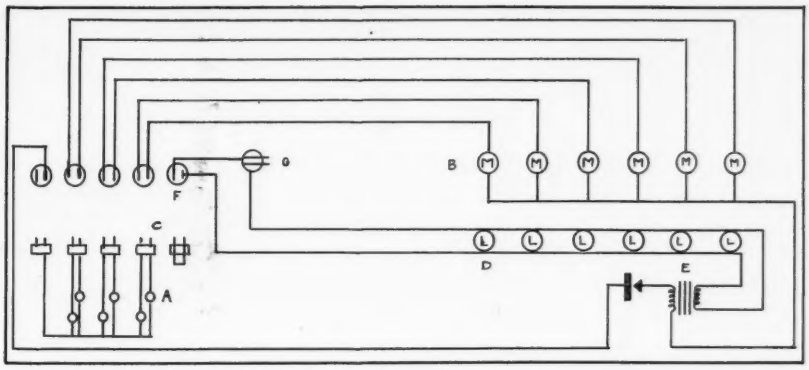


Figure 5

one for the minute within the quarter. Each of these is a separate unit (figure 3), identical to the rest except the quarter and minute units, which differ only in the size or type of the dial and in the position.

The figures seen on the board are on the circumference of celluloid drums which are revolved by a small electric motor, the armature of which is arrested in its operation. Within each drum is an electric lamp which illuminates the figures so that they may be read from any part of the gymnasium.

Figure 2 contains front, top, and side views of the small arrested-rotation motor that actuates the drums. When the circuit is completed, the armature (10) rotates clockwise for a quarter of a turn, being kept from further rotation by the arm (8) and spring attached. When the circuit is broken, the spring attached to (8) returns the armature to normal position, causing dog (9) to engage the ten-tooth ratchet (13). The shaft of this ratchet is an extension of the shaft of the large celluloid drum on the circumference of which are the figures. The dog (9) revolves the ratchet, and therefore the drum, through an arc of 36°—thus presenting the next higher number to the opening in the face of the scoreboard.

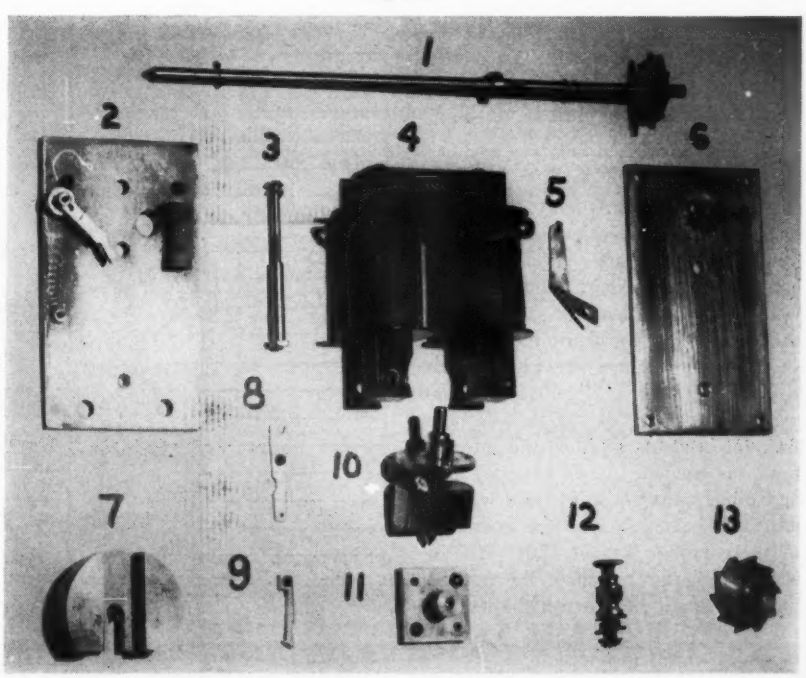
Simplicity of construction of this motor is shown by the parts as pictured in figure 4. The numbers of these parts correspond to those in the description above. When this board was made, materials such as brass and aluminum were obtainable and used extensively throughout the mechanism. Present conditions may require the substitution of sheet iron, white metal, plywood, and other materials for those no longer available. Actual cost of the board to the student fund was fifty dollars. Savings could have been made if materials had been at hand in the shop, rather than purchased separately.

Operation of the board is from a series of pushbuttons mounted in a wooden base the same shape as the scoreboard itself (see figure 1). Reference to figure 5, the wiring diagram, will show how the actual completion of the circuit takes place. The base with the buttons (figure 5, *A)*, at the timekeeper's desk, is connected to six Bryant plugs (*C*) in a square fiber block (figure 1). The plugs in this block are pushed into six Bryant receptacles assembled in a square outlet box with cover and lock. The extra receptacles and cord are provided in case of breakage. This method of wiring enables the board to be disconnected between games and assists in wiring the control-board to the portable timekeeper's table.

Current to operate the board is supplied by a 10-volt D.C. rectifier (figure 5, *E)*, connected to the regular 110-volt lighting circuit *(G)* in the gymnasium. A study of figure 5 will show that pushing any one of the six buttons *(A)* will complete the circuit for the particular numbered drum to which the circuit is wired, thereby causing the motor *(B)* to revolve the drum to the next higher number. You will also note that one of the Bryant plugs *(F)* is short-circuited and wired directly to the 110-volt circuit rather than to the 10-volt line. On this 110-volt line are five 40-watt lamps *(D)*, each inside one of the drums to illuminate the figures. On the same circuit with the lamps is the 10-volt rectifier.

The rectifier used here was from an old radio loudspeaker. The use of direct current gets around the vibration incident to the use of alternating current; the low voltage reduces the chance for fire, increases compactness of the control board, and is generally safer.

Figure 4



A 6-volt storage battery or dry cells could have been used, but are much more troublesome.

Many processes in each of the shop fields are needed in the construction of this scoreboard. In electricity, both theory and work are needed in magnetism, the motor, the transformer, the A.C.-D.C. rectifier, insulation, series and parallel circuits, switch control, winding of magnets, polarity, and sizes, kinds, and uses of wire.

In machine work, needed are the tasks of laying out, selection of material, drilling, tapping, straight turning, milling, fitting, filing, making springs, measuring, centering, counter boring, and bending.

Woodworking operations include selecting lumber, laying out, rip and cross cutting, mitering, planing, sanding, finishing, joinery, fitting, glueing, measuring, squaring, band-sawing, and installing hinges and hardware.

The drafting students must make drawings from rough sketches, lay out numbers on celluloid, fill in with india ink, make blueprints, and check for accuracy.

CONSTRUCTION HINTS:

Cores: Cores must be wound evenly, in the same direction, each with 14 layers of wire. This is done so the inside ends can be connected together, thereby eliminating the chance of their breaking off. Outside ends are the lead wires and are always handled more than the inside ends; they can be lengthened in case of breakage by removing a few turns from the coils. All leads should be on the end of the yoke opposite the armature; this makes the leads shorter and keeps them out of the way of the moving armature.

Templates: Extensive use of templates and jigs in the construction of parts is advisable, often necessary, especially in drilling holes. For example, six fiber cams (figure 4, on part 2) are needed; these should be made using a cold-rolled steel counterpart for drilling and filing the contours. Piece 7 in figure 4 is a jig used to assemble the armature and disc on the armature shaft accurately.

Ratchets: Part 13, figure 4, is the ten-tooth ratchet which revolves the drum. This is cut from a bar of steel which is milled between centers after turning on the lathe. The indexing head for the milling machine is needed here. The milled bar is replaced on the lathe, the shoulders turned for each piece, and the ratchets then cut apart.

Drum discs: On this scoreboard, the tops of the drums are made of 1/16" aluminum. Plywood ¼" thick would also be suitable; the celluloid could then be fastened with small brass round-head screws at intervals of two inches. Holes should be cut in the discs, whatever the material, for ventilation, since the lamps generate much heat.

Complete working drawings for this electric scoreboard are being prepared, and will be ready soon. Any instructor wishing to have a set may address the author: Walter B. Weber, Electrical Instructor, State Teachers College, Buffalo, New York.

BILL OF MATERIALS:

Magnetic circuit:

¾" square cold-rolled steel: 8'
1/16" fiber (washers, insulating binding posts): ¼ sq. ft.
.010 fiber paper: 1 sq. ft.
No. 24 S.C. enameled wire: 5 lb.

Electric circuit wiring:

⅛" cotton sleeving for lead wires: 5'
Binding posts, 8 x 32 thread: 12
Fiber tubing, 3/16" ID: 3'
Porcelain cleat receptacles: 5
Lamps, 110-volt, 40-watt: 5
Rectifier from radio loudspeaker delivering 10-volt D.C.
Bryant I.L. 1320 receptacles: 6
Bryant I.L. 132 plugs: 6
S.P. snap switch to control unit: 1
Pearl pushbuttons, (Edwards No. 59): 6
Twisted cotton lamp cord, No. 18: 9 strands braided to length needed.
Weatherproof bell wire, No. 18: enough for cable to reach from scoreboard to receptacles.

Miscellaneous:

Brass plate, 5/32": 6' x 3"
Brass rod or cold-rolled steel: ½" x 1½'
Brass rod or cold-rolled steel: 1½" x 9"
Band iron: 1" x 3/16" x 12'

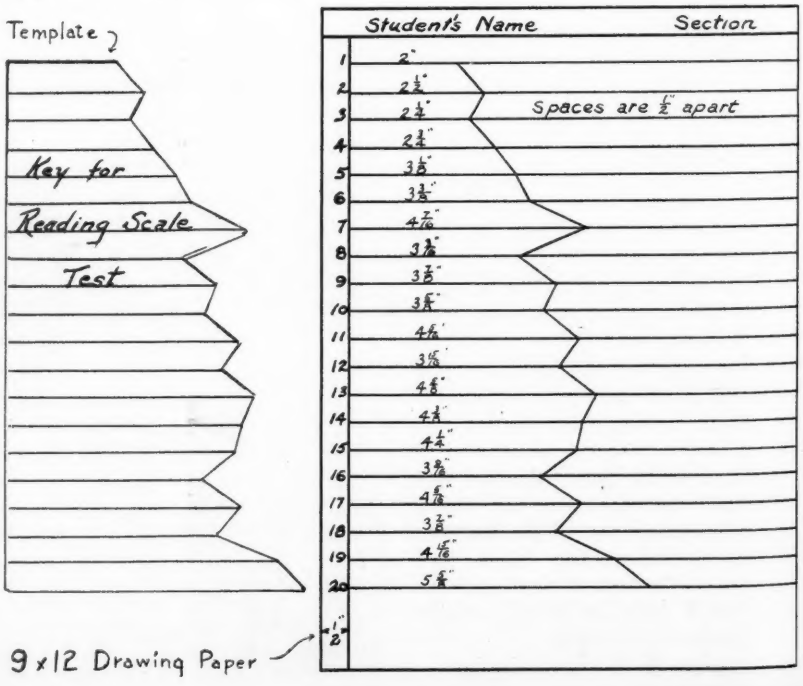
(Continued on page 23)

Test on Reading a Rule

• *by* **ALBERT K. LOPER**

Instructor in Mechanical Drawing, Allegany High School, Cumberland, Maryland

READING a rule may be thought of as a simple process in our scheme of education, but after several years of experience with seventh graders in first-year mechanical drawing, it was found that only a few could use the foot rule well. A short time was given to the study of the scale (12" rule edge). Naturally a method of determining how well the students retained the information was needed. A test covering lines and dimensions and directions was given. The next job was the correcting of these papers (about 150). The accompanying figures show the test and the method used to correct the tests. A sheet of some transparent substance makes an excellent template.



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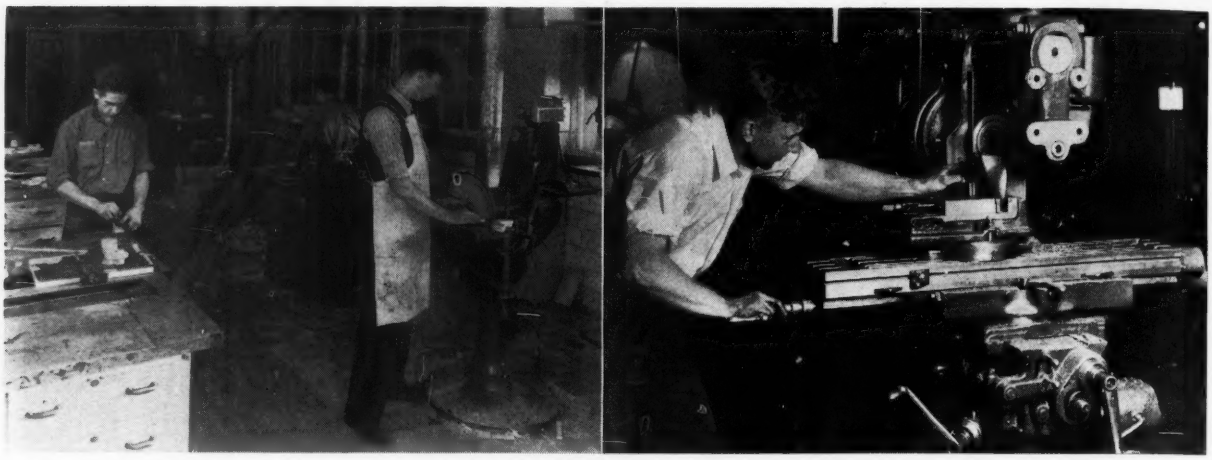

Left: Defense-training class in patternmaking at Macomber Vocational High School, Toledo, Ohio. Right: Milling-machine operation at Samuel Gompers Trades School, San Francisco, California.

Defense Training's New Jobs

BY *L. S. Hawkins,* DIRECTOR, VOCATIONAL TRAINING FOR DEFENSE WORKERS, U. S. OFFICE OF EDUCATION, FEDERAL SECURITY AGENCY

THE task of the program of vocational education for defense workers is to train large numbers of persons for war industries, each equipped with specific skills. This task of vocational education is different from the peace-time job of the public vocational schools which emphasizes a broader training of the individual in the trade of his own choice. By the end of December, 1941, there were 900,000 cumulative enrolments in supplementary training and 770,000 cumulative enrolments in pre-employment training. By the end of December there were cumulative enrolments of about 330,000 persons in out-of-school youth courses.

Ultimate limits of the defense-training program are established by the character of war industry. The major expansions under the defense program were in four industries: aviation, shipbuilding, ordnance, and machine tools. In general it can be said that the defense-training program will continue to supply workers for these principal industries. Each successive increase in the goals that are set for the total volume of war material necessarily increases the number of workers with requisite skills which are needed to achieve these goals.

There are, at the present time, about five million persons engaged in defense production. By the end of this year, the U. S. Bureau of Labor Statistics reports, there will be fifteen million workers so employed. Two million of the increment, during the year, of ten million defense workers will be new persons in the labor market without any previous skills that can be put to productive purposes in the present situation. Not all of the eight million workers who will be diverted from civilian production will require training. Many will continue to work where they are and to make essentially the same products as at present, but the product will be used for military purposes. But even with this limitation, the training responsibility is a tremendous one. Workers who have been building automobiles, refrigerators, washing machines, and stoves may have skills which are transferable to war production without retraining. If they do, the problem is one of recruitment and of inducing them to move, if they are not already there, to centers where their skills will be useful. If their skills are not immediately transferable without retraining, then it is the job of the training program to provide them with new skills that will have relevance to the new materials we are now building.

Conversion training will be more and more important in the training program. We have only just begun to convert to wartime production. We are now producing two billion dollars of war goods each month. Present plans call for an ultimate war production of more than four billion dollars per month. Whole new factories will come into production for the first time this year and next. The result will be smaller and smaller proportions of scarce materials for civilian production, more and more civilian plants curtailing their activity, and greater and greater numbers of workers displaced by material shortages.

It has been estimated that more than two and a half million workers will be affected by material shortages and production curtailment quotas.

The task of the training program is to make these workers available, in a minimum period of time, for the war industries. We have to anticipate and gage the requirements for additional workers and the displacement of workers, to match as closely as possible displaced skills with needed skills and to convert the one to the other with the least possible delay.

The defense-training program has passed through several phases. It was first organized in the summer of 1940.

At that time there were still eight or nine million workers unemployed. Great numbers of them had at some time been employed in industry where they had acquired skills which could now be applied to production. Through long periods of disuse in the years of the depression, these skills had become "rusty" and the workers would not be reemployed without training to refresh their skills. The refresher aspect of the training program was, therefore, the major emphasis at first. The majority of trainees enrolled in defense classes were persons being trained prior to employment and the majority of these were persons in the refresher category. Classes were largely made up of workers from the rolls of the U. S. Public Employment Service and the Work Projects Administration and required, by the WPA, as their work relief assignment, to attend the training classes.

By the summer of 1941 the supply of persons with refreshable skills had been almost exhausted. The emphasis of the training program, therefore, shifted. The most pressing problem at this time became the need to provide industry with workers equipped with the higher skills. Defense plants were experiencing extreme shortages of these workers. Industry, itself, was in a position to give training on the job to only part of its requirements. It was not equipped at all to give training in collateral subjects like shop mathematics, or blueprint reading, which were necessary for certain of the skilled jobs to be performed. The defense-training program undertook to fill these deficiencies. The majority of trainees were now enrolled in what were called supplementary classes. These were classes attended by persons already employed in defense industry who were being trained for up-grading to higher skills than those at which they worked.

Concurrently with this supplementary training, trainees continued to be enrolled in pre-employment classes. They were largely persons who could be made available to industry with limited training.

Now we expect to come into a third phase. There are now something over two million men in the armed forces. By the end of this year, it is expected this will be increased to about four and a half million. A large part of this increase of more than two million men will be drawn from industry. This will occur at the same time that the demand for industrial manpower increases and the supply of presently available industrial labor decreases. The reservoir of unemployed workers is now estimated by the WPA to be about 3,800,000. We can expect that employables remaining in the reservoir will be drawn off in a comparatively short period of time. It will then become necessary to resort to new, untapped sources of supply who will be induced to come into the labor market. They are women and youths not normally in the labor market, rural labor, older persons and minority groups, the greater part of whom will have had no previous industrial experience, who will respond to job opportunities and higher wages. It has been estimated that there are 6,700,000 such persons, of whom two to three million are farm workers.

The defense-training program administered by the U. S. Office of Education functions through grants made by the federal government to the states for the operation of the program. These funds are not matched in any way by the states. A cooperative federal and state relationship is developed in what is known as a state plan, which is, in effect, a contract between the state board for vocational education and the federal government. It sets standards of administration and supervision of the program, specifies the types of training to be provided and the qualifications of

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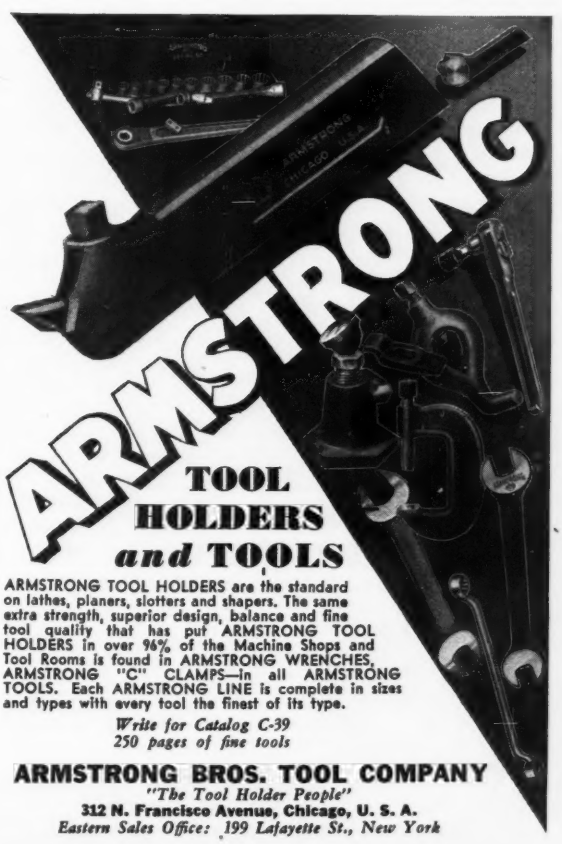

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teachers and supervisors, and requires the establishment of representative advisory committees. Training may be given under the defense-training program only for occupations designated by the War Production Board and found to be essential to defense industry and for which a shortage exists or is anticipated. Regulations require that advisory committees with representation from labor, industry, and agriculture and with government officials serving in consultative capacities be set up to furnish guidance in the development of the program.

Long before the attack on Pearl Harbor, more than 500 vocational schools throughout the country were operating 24 hours a day. Since this country entered the war, many other vocational schools have gone on a 24-hour-a-day schedule—some of these schools never close their doors from one week-end to the next. In order to accomplish the training task ahead, it may be necessary for all public vocational schools to keep their shops running day and night, 24 hours a day, 7 days a week, for the duration.

Aliens and National Defense

It is especially important that vocational instructors know the status of aliens in connection with war industry and with training for industry. Teachers should note that *citizenship is not required* for admission to National Defense classes.

Teachers, as well as employers, should bear in mind that the mere accident of birth in a foreign land does not produce disloyalty. In fact, wholesale discrimination on the part of employers, President Roosevelt has stated, is the very source of disunity and distrust "on which our enemies are counting to defeat us." There is *no prohibition against the employment of aliens* except in defense work of a secret nature, and even in such work the employer may obtain special permission of the Army or Navy.

WON'T you tell SCHOOL SHOP what you are doing in your shops in the war-time training program? Short articles are wanted, particularly on "shop hints" that will be of assistance to other defense-training teachers in their work. Address SCHOOL SHOP, Box 100, Ann Arbor, Michigan.

Increased Training Demands

The need for tremendously increased programs for the training of war workers was pointed out in a recent statement by Col. N. A. Burnell, 2nd, Director of Defense Training for the Federal Security Agency. The statement said that it is absolutely essential that every training station in the country be used 24 hours every day, and seven days per week.

Vocational schools have been called on for immediate expansion of their wartime training programs, not only through the full-time utilization of present facilities, but through up-grading of course content and methods of instruction and by addition of new facilities as well.

Length of course should be cut to the minimum period consistent with adequate training. This increases the effectiveness of the training time available. All available equipment and space in every community must be sought out and put to work, if not in actual production, then in vocational training.

Aluminum Scrap Disposal

Supplementary Order M-1-d, issued recently, clamps air-tight controls over the disposal of aluminum scrap produced in vocational schools. It is to be especially noted that any school generating 1,000 pounds or more of scrap per month must segregate the scrap according to kind, at the machine.

Atlas CATALOG of DEFENSE Training Equipment

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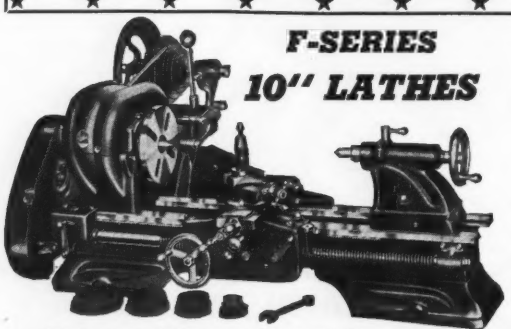

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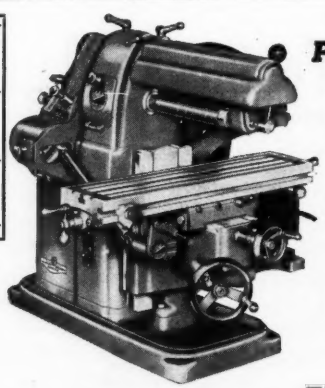

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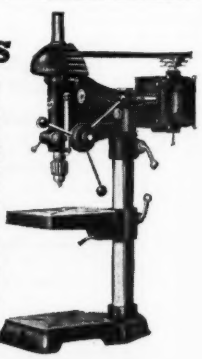

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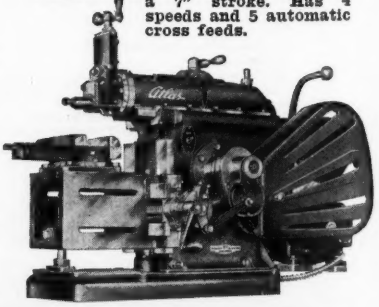

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Drift and Drive-pin Punches

by MILTON SCHRAG

HERE is a project, or series of projects, that lends itself to the short class periods of the usual school shop. The drift and drive-pin punches described are easy to make, yet give the beginning machinist the feeling that he is making something of obvious value.

Simple though the punches are, making of the whole set will provide many educational benefits. Repetition necessary in making the whole sets of punches will give the beginner practice in judging maximum feeds and cutting speeds allowable over a considerable diameter range. Repetition will also give the student more proficiency and confidence in the following technics:

1. Centering and center-drilling.
2. Rough and smooth turning; filing and polishing.
3. Knurling.
4. Cutting off and finishing ends.
5. Turning tapers.
6. Executing various lathe setups.

Making of these sets of punches will impress the student with the fact that the turning speed should be held to just under the point where a rough cut would result, and that the depth of cut should be as deep as the lathe will handle, consistent with good work. He will learn that a slower speed or smaller cut than the maximum possible is a waste of time.

Each punch will require from one to two hours, or one or two class periods, for completion. Following are the steps in making the drift punch, figure 1:

1. Set up lathe for center-drilling, preferably by mounting drill in headstock and center in tailstock.

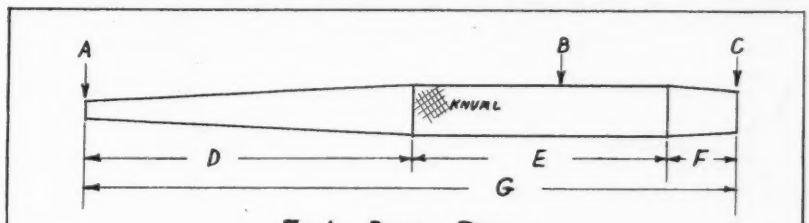


FIG 1. DRIFT PUNCH

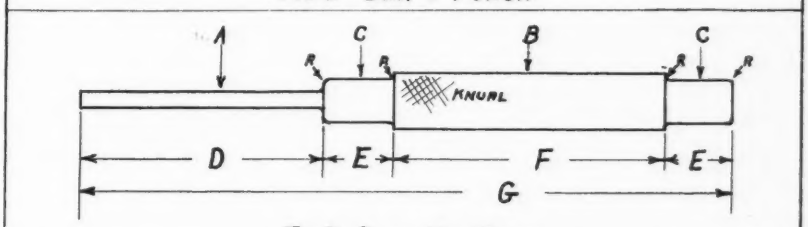


FIG 2. DRIVE PIN PUNCH

2. Select stock, locate centers, and center punch for drilling.

3. Center drill in lathe by holding stock with left hand while feeding with tailstock screw.

4. Set up lathe with face plate.

5. Clamp stock in lathe with lathe dog.

6. Rough turn to size in one or two cuts.

7. Finish turn and file if necessary.

8. Set up lathe for knurling; knurl stock.

9. Lay out stock for tapers *D* and *F*.

10. Turn taper *D* by setting over the tailstock. (This may be varied for part of the set by using a taper attachment.)

11. Taper in section *F* may be turned with lathe centers in line by using a combination of hand, cross, and longitudinal feeds. (This, too, may be varied by setting the compound rest at the desired angle, thereby acquainting the student with all three methods.)

12. File and polish tapers. Portion *D* should be especially smooth to facilitate its use in lining up holes.

13. Cut off with cut-off tool and hacksaw.

14. Wrap punch in sheet of soft metal and chuck in lathe.

15. Square off head and finish to slight oval.

16. Temper or harden punch.

The author has added that extra touch needed to lift this project above the level of the ordinary "punch" project. Milton Schrag teaches in the Augusta, Kansas, schools.

Procedure for the drive-pin punch in figure 2 is essentially the same as for the drift punch, except that no plus tolerance can be permitted on portion *D*, which must follow a pin through drilled holes of its given diameter.

The punches, if made of mild steel, can be tempered or flame hardened with the oxyacetylene torch. Flame hardening may be done by adjusting the flame to burn with an excess of acetylene, heating the punch to red heat while rotating it, and then plunging it in cold water. This should be repeated until the desired hardness is obtained. This process makes use of the fact that such a flame contains excess unburned carbon which is absorbed by the steel, making the treated portion a form of carbon steel. Care must be taken, however, not to make the punch too brittle; occasional testing can be done with a file.

Schedules Of Sizes For Punch Sets

DRIFT PUNCH:

No.	A	B	C	D	E	F	G
1	3/8	3/4	5/8	7-1/4	4	3/4	12
2	1/4	5/8	1/2	6	3-3/8	5/8	10
3	3/16	1/2	7/16	5-3/8	3-1/8	1/2	9
4	1/8	7/16	3/8	4-3/4	2-3/4	1/2	8

DRIVE-PIN PUNCH:

No.	A	B	C	D	E	F	G	R
1	3/8	3/4	5/8	3-1/4	5/8	3-1/2	8	1/16
2	5/16	11/16	7/16	3-1/4	5/8	3-1/2	8	1/16
3	1/4	5/8	3/8	3-1/4	5/8	3-1/2	8	1/16
4	3/16	1/2	5/16	3-1/4	5/8	3-1/2	8	1/32
5	1/8	3/8	1/4	2-3/4	1/2	3-1/4	7	1/32
6	3/32	5/16	7/32	2	3/8	2-1/2	5-1/4	1/32
7	1/16	5/16	3/16	1-1/2	3/8	2 1/4	4-1/2	1/32

Fletching Tool

BY *Homer C. Rose*, SOUTHERN ILLINOIS NORMAL UNIVERSITY, CARBONDALE

A FLETCHER that mechanically takes care of gluing feathers to arrow shafts is a great help in either making or repairing arrows. The device can be made of common materials with ordinary hand tools and the lathe.

The base is turned from a block of wood mounted on the face plate of the lathe. The center hole which holds the arrow should be drilled while the block is in the lathe. The arrow will then stand at right angles to the base.

The clamp plates, Part 1, may be cut from brass, copper, or bright tin, filed smooth, and soldered to the paper clips.

The small guides, Part 3, should then be cut, bent to approximate shape, and soldered to the clamp plates. It is necessary to stagger these guides above or below center of the clamp plate so that guides on one will not strike another when in use. (See photograph.) The guides now may be formed with round-nosed pliers until they fit the arrow shaft exactly.

Cut pin plate, Part 2, from 16-gauge iron. Drill and file.

The arms, Part 4, are constructed of 16-gauge metal, cut, filed, drilled, and bent. (See drawing.) Rivet arms to pin plate, leaving a free movement of the parts. Small machine screws may be used in place of rivets.

Solder the pin plate to the paper clips, taking the precaution of keeping all parts centered and square to each other.

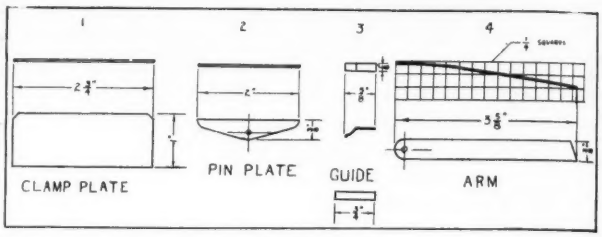
Secure three one-inch butt hinges and solder to lower end of arms as shown in drawing. Locate these hinges 120° apart on the base and fasten with appropriate flat-head screws.

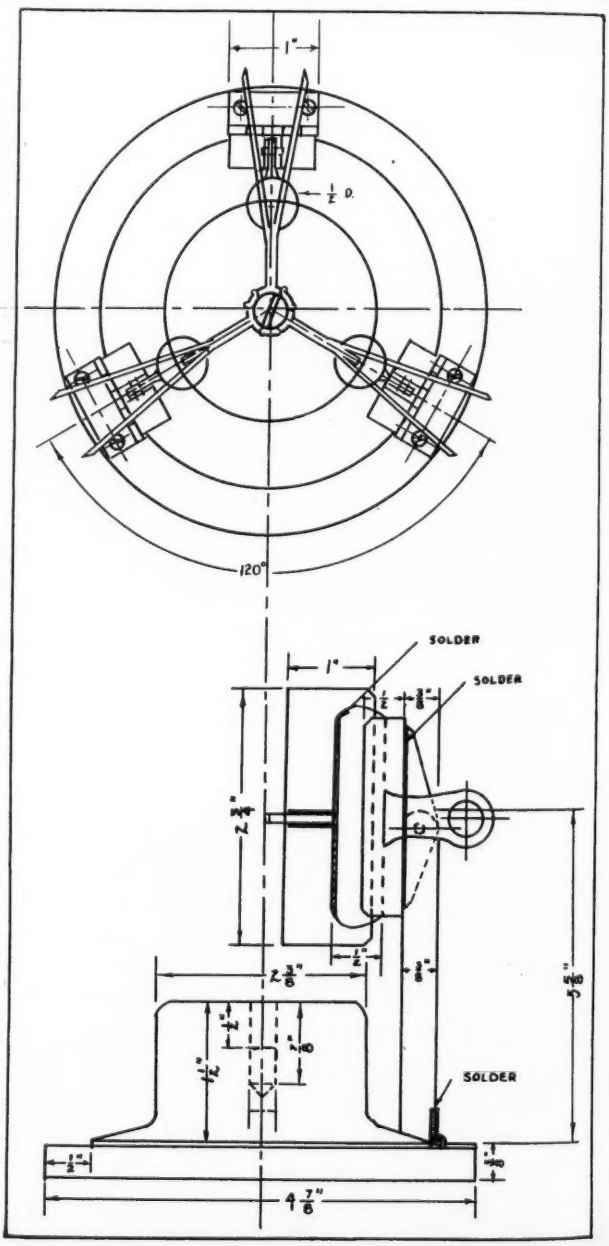
One of the three feathers on a standard arrow is usually of an odd color. This feather should be at right angles to the string notch in the end of the shaft. To facilitate gluing feathers in this relationship, a small piece of wood, fitted to the notch of the arrow, is forced down into the hole in the base of fletcher and glued in place. Location is shown in drawing. Since this piece is at right angles to one of the clamps, this clamp should always hold the odd colored feather. Mark the clamp so that it can easily be identified for quick work.

In use, feathers are placed between the clamp plates, adjusted, sanded, covered with a thin layer of glue, and then swung up into place against the shaft. The fletcher will locate the feathers 120° apart, the proper distance from the end, and will hold them firmly against the shaft while the glue is drying. If additional pressure is judged convenient, heavy rubber bands may be put around the three clamps. A quick-drying glue is best if a number of arrows are to be made.

Bill of Materials

Clamp plate (part 1): brass or tin, 1" x 2¾" x 28 ga. 6 pcs.
Pin plate (part 2): brass or iron, 1/16" x 2" x ⅜". 3 pcs.
Guide (part 3): brass or tin, ⅛" x ¾" x 20 ga. 6 pcs.
Arm (part 4): brass or iron, 1/16" x ⅜" x 3⅝", 6 pcs.
Spring paper clips (part 5): 2", 3 pcs.
Base (part 6): soft wood, 1¾" x 5" x 5", 1 pc.
Hinge (part 7): butt hinge, 1", 3 pcs.
Solder, enamel.



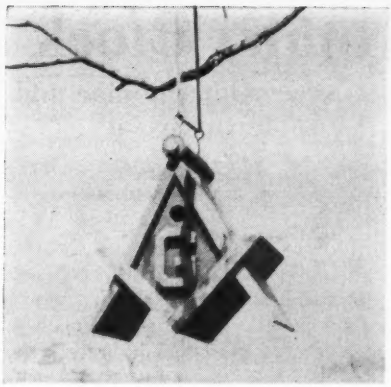


Masonic Emblem Wren House

BY *Earl W. Boyer*
DOBBINS VOCATIONAL SCHOOL
PHILADELPHIA, PENNSYLVANIA

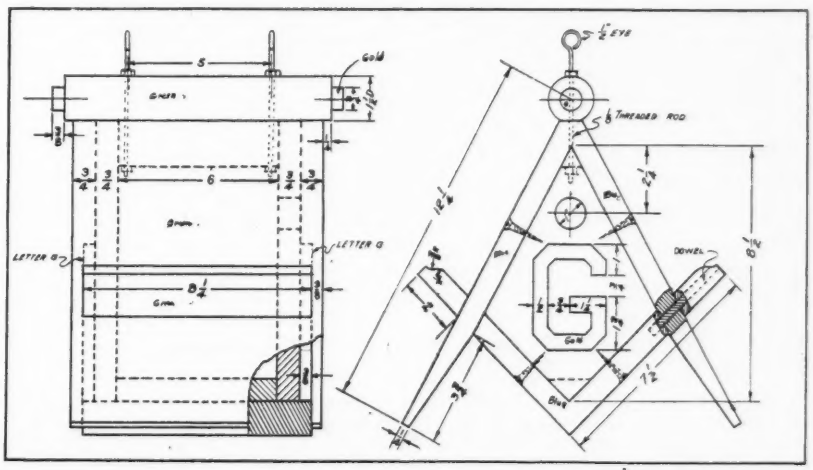
THE house wren is one of the most sociable and amiable of feathered friends and one that is easily attracted to the premises. Surely it is a bundle of animated feathers, always bubbling over with mirth. Here is an unusual design for a commodious and easily cleaned house to attract these birds to your community.

The Masonic Emblem furnished the idea for this wren house, which has proved to be very satisfactory. The bottom is formed by two boards making a 90° angle, representing the square. These are nailed to the two slanting roof boards, representing the compasses. The two pieces on the roof, in line with the bottom boards and representing the ends of the square, are fastened to the roof by means of dowels. The roll, representing the eye of the compasses, is fastened with two threaded eye bolts which also serve as a means of suspending the house. The front is secured in place by means of screws which may be removed in order to clean the house. The letter G serves as a perch. Nothing else is necessary.



A bird-house project particularly appropriate for the spring season.

An attractive color scheme is to paint the roof green, the ends red, the *G* gold, and the ends of the roof, representing the compasses, blue. Wrens do not seem to notice the colors, but the odor of fresh paint will keep them from the house.



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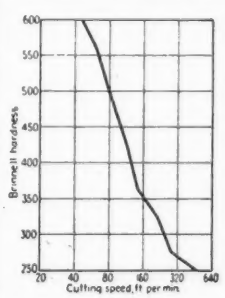

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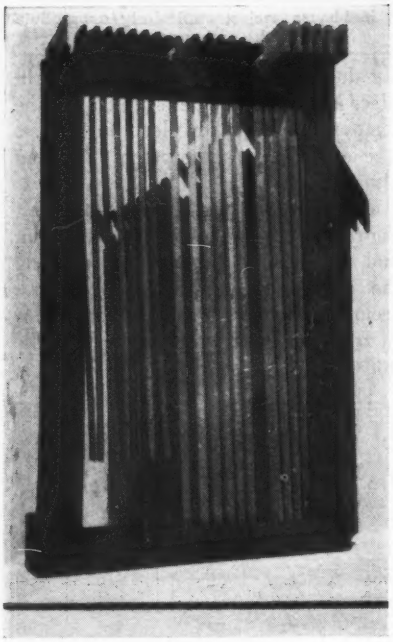
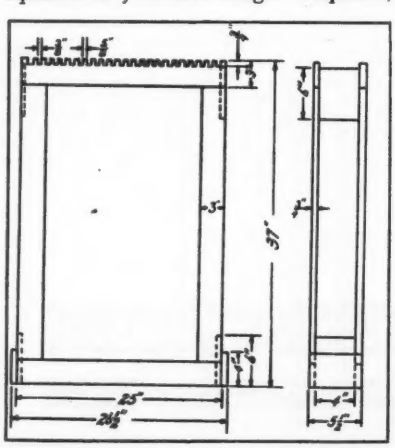


T-Square Rack

BY *Wade Wilson,* HEAD
INDUSTRIAL EDUCATION DEPARTMENT
A. & I. STATE COLLEGE
NASHVILLE, TENNESSEE

WHAT to do with T-squares when they are not in use is a troublesome problem for many teachers. This is especially true in the smaller schools and colleges. Many teachers have the pupils hang the T-squares on nails or screws somewhere in the drafting classroom. When this method is used the T-square is subjected to undue wear and abuse. Such wear and abuse reduces the accuracy and the life of this drafting tool. This project aims to remedy this condition and improve the general appearance of the classroom.

This rack will hold 24 36-inch T-squares. If you have longer T-squares, change the length of the standards accordingly. If you have more than 24 T-squares, add one inch per T-square to the length of the top and bottom rails.



With each T-square numbered and each T-square having a special slot this project becomes a valuable teacher-aid in classroom management.

Holder Block

for sal ammoniac and soldering paste

BY *Alex L. H. Darragh*
TILDEN TECHNICAL HIGH SCHOOL
CHICAGO, ILLINOIS

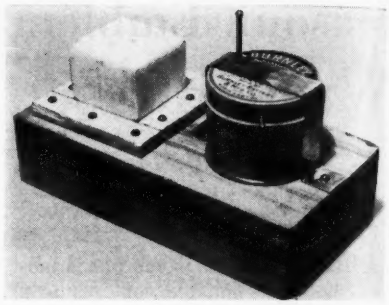
ISSUING shop materials such as solder, wire, raw stock, soldering paste, and similar expendable goods involves some form of control to insure correct use and avoidance of waste.

A minor problem was to control the use of soldering paste and sal ammoniac. The equipment described was made up and found to be the solution to the problem.

The picture and drawing of the "sal ammoniac block," as the pupils call it, indicates the general construction. Note the nail-hole in the lid, located off-center. When pumped up and down, the nail brings up paste, finally clearing a hole in the paste. By turning the can, a new supply is brought into place. The nail is removed of course to use as an applicator.

The sal ammoniac block is held in place because two opposite edges are undercut, and the two ¾" x 1¾" strips, chamfered one edge each, wedge into these undercuts.

Originally, one holder was made up.



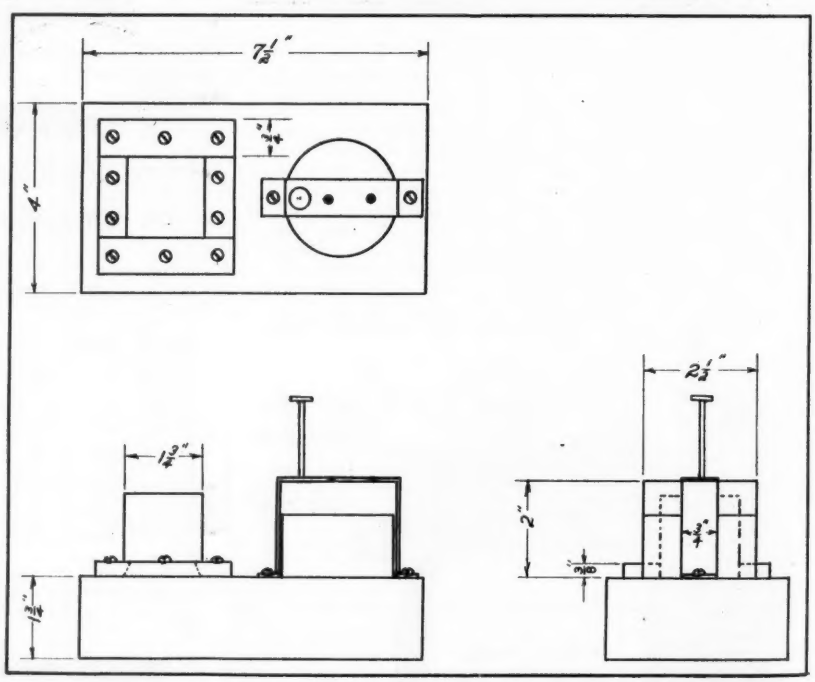
It proved satisfactory, so pupils made up five more. Three or four are in constant use, with the extra units on hand for immediate replacement, in order to refill when convenient.

Prior to using the blocks, a can of soldering paste lasted from two to four weeks, sal ammoniac a little longer. Now three months use is common, with four to five months not unusual. Emphasis has been made on the proper use of the sal ammoniac, so that pupils no longer "dig holes" in the chemical blocks.

BILL OF MATERIALS:

1 block of wood, 7½" x 4" x1¾"
1 block of sal ammoniac, 1¾" cube
1 can soldering paste, 4 ounce
1 strip sheet metal, ¾" x 8"
12 wood screws, No. 6¾" round head
2 strips wood, ¾" x 3¼" x 5/16"
2 strips wood, ¾" x 1¾" x 5/16"
1 nail or brad, 2½" or 3" long

[Pat. Appld. For]



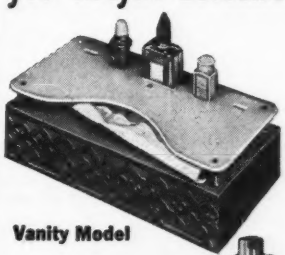
Personalities . . .

CARL A. BELL, Director of Vocational Education for Illinois, died February 12 as the result of an automobile accident. . . . Now teaching at Slauson Junior High School, Ann Arbor, Mich., is DON FRANCISCO, formerly at Saline, Mich. . . . The death is announced of ARTHUR RAYMOND, former industrial arts teacher at Athens, Ohio, high school, in a plane crash at Kelly Field, Texas, in December. He was in training in the Army Air Corps at Kelly Field. . . . GORDON KOFFRON has replaced DONALD OLSON as industrial arts teacher at Dawson, Minn., public school. OLSON has taken a position at Long Prairie, Minn. . . . HERBERT C. IVERSON now teaches industrial arts at Morgan Park High School, Duluth, Minn. . . . FRED W. RATHJEN has transferred from Manual Training High School, Brooklyn, N.Y., to the Fort Hamilton High School of the same city. . . . First president of the National Association for Printing Education is LEROY BREWINGTON of State Teachers College, Pittsburg, Kansas. Other officers named in the organization's recent election are: FRED W. MILLER, Masonic School of Printing, Fort Worth, Texas, vice-president, and FLOYD C. LARSON, Menominee, Mich., schools, executive secretary and treasurer. New members of the Board of Directors are GEORGE T. HART of Franklin High School, Rochester, N.Y., and EDWIN B. HARDING, State Teachers College, Brookings, S.D., who has also been appointed to co-chairmanship of the N.A.P.E. Research Committee. . . . Third death chronicled this month is that of WILLIAM M. FEIST, second assistant in vocational education, Detroit, Mich., schools. Feist had been in the Detroit system from 1925 until his death in December, teaching previously in Janesville, Minn. . . . MERLE A. DENNING, formerly at Normal, Ill., now teaches industrial arts at Hitchcock Junior High School, Galesburg, Ill. . . . IRWIN H. ENLI, formerly at the Aycock School, Greensboro, N. C., now teaches general shop at the Oconto, Wisc., high school. . . . As the new superintendent of the Belden, Nebr., high school, J. HOWARD FRAZEE will be in charge of vocational training in that school. His duties at Osmond, Nebr., schools are being taken over by GAIL A. SMITH, superintenednt of that system. . . . JAMES H. BRILL has resigned his teaching position at Adams Township School, Sidman, Pa., to accept the position of draftsman in the engineering design section of Armstrong Cork Co., Lancaster, Pa. . . . William Butts is now apprentice coordinator at Newberry, Mich. His place at Barryton, Mich., schools has been filled by HOWARD CURRIER, who comes to Barryton from Cement City, Mich. . . . EVERETT H. HOPKINS has been recently appointed director of the new two-year curriculum in vocational education, Miami University, Oxford, Ohio. . . . SAM GEORGE now directs the industrial arts program at Reed City, Mich., and teaches general and farm shop. DAN EVANS, who formerly held this position at Reed City, now teaches at Alpena, Mich. . . . WILLIAM W. RITTER, formerly instructor of industrial arts in the Boys Industrial School, Topeka, Kansas, and later of the NYA school in Wichita, is now a junior instructor in the Naval Aviation School in Chicago. . . . LESTER L. FEHR, formerly of the Industrial Education Department of Pennsylvania State College, is now Area Coordinator for Industrial Education in the State Department of Public Instruction.

INDUSTRIAL ARTS INSTRUCTORS!

FREE PLANS—

for useful Kleenex* Tissue Dispensers!



Vanity Model

Bathroom Model

• Here's a natural for you . . . no cost, no obligation. Twelve free plans for making useful Kleenex Tissue Dispensers complete with detailed instructions. All designed, drawn and shop-tested by expert craftsmen.

Instructors everywhere are enthusiastic! This project permits a wide range in selection of materials and in construction techniques. Two separate portfolios available . . . one for elementary levels, one for secondary levels. Mail coupon today or write on your school letterhead.

*T. M. REG. U. S. PAT. OFF.

Mail Coupon Today for Free Plans!

Kleenex Projects Service
Dept. SC-4, 919 N. Michigan Ave., Chicago
Please send me without cost or obligation,
the Kleenex Projects Service Portfolios checked below:

☐ Portfolio No. 1 for elementary levels
☐ Portfolio No. 2 for secondary levels

*Name*_____
*School (or Club)*_____
*Address*_____
*City*_____ *State*_____

Timely Demonstrations

by BERNARD J. KENNEDY

Mechanical Drawing Instructor, Ottawa Hills High School, Grand Rapids, Michigan

WOULDN'T it be wonderful to have a class in which all of the students were on a par of intelligence, aptitude, interest, and ability? We know that this is an idle dream, as each class seems to have its percentage of above-the-average students as well as plodders. This fact leaves us face to face with the problem of regulating the time of our presentation of demonstrations so that these two groups, as well as the average boy, will get the most out of them. What drafting instructor has not been faced with this problem over and over again?

Demonstrations given as soon as the more advanced students are ready for them are at least partly forgotten by the slower students by the time they reach that particular phase of the work. To delay the demonstrations until the slower students are ready, usually unjustly penalizes the rest of the class for their ability and faster work. I find that furnishing each student with a blueprint, as illustrated below, is the ideal solution to both of these problems.

The class is started with a demonstration and a thorough study of isometric drawings. They then proceed to draw the list of "required" isometric plates in the given order. Those who work more rapidly will complete the drawing of the "*dog*" before the majority of the class is ready to start the study of a new type of drawing. These more adept students then start on the list of "optional" isometric plates. These drawings are more complicated, and are designed to give the students with more interest and aptitude a better chance to show their abilities. They continue on this list of plates until a survey of the class shows that the majority of the students are ready to proceed with the study of the next type of drawing. At this time the entire class participates in a study and demonstration of oblique drawing. When the students, who have not started on the optional isometric list, complete the drawing of the *dog*, they start drawing the first required oblique plate. The students who are working on an optional isometric plate finish it; and then continue with the oblique drawing of the *crank*.

This procedure is followed throughout the entire course; and has been found to be very successful. It has given the above-the-average students a chance to exert themselves; and the slower thinking and working students the consideration that they need and deserve.

This portion of the print, given to the members of the class, will illustrate the course as presented to the students.

MECHANICAL DRAWING
COURSE II

TYPE	REQUIRED PLATES	OPTIONAL PLATES
Isometric	Wedge Square Stake Circles Dog	Fulcrum Core Box
Oblique	45° Crank 30° Core Box	30° Square Stake 45° Yoke
Cabinet	60° Clamp Plate	30° Plungerhead
Perspective Parallel 45° Angular 30°-60° Angular	Par. Channel Block 45° Channel Block 30°-60° Channel Block 45° Ventilator 30°-60° Core Box	Par. Joints 45° Angle Block 30°-60° Fulcrum
Development etc.	Problem No. 1 Funnel etc.	Y Branch etc.

The Cover

The symbolic picture on this month's cover was prepared by the Air Youth of America, a division of the National Aeronautic Association organized to further model aviation training for American youth in public schools.

WHAT'S DOING IN THE FIELD

news

OF INDUSTRIAL EDUCATION

THE month of March saw the meeting of several state associations. On March 19 to 21, the New Jersey Vocational and Arts Association convened at Asbury Park. The Illinois Vocational Association met at Chicago on March 26 to 28. The Florida Vocational Association meets at Tampa on April 9 to 10.

KINGSTON, Pa., has a new general industrial arts shop comprising six stations in each of the following fields: woodworking, metalworking, electricity, and drawing. Additional investment in building alterations and new equipment totals approximately $10,000. In charge is GEORGE W. KEIFER, of Sunbury.

PITTSBURGH, Pa. is the scene of the twenty-first annual Conference on Printing Education, to be held at Carnegie Institute of Technology, June 29 to July 1. With the needs of war-time education as the theme, the conference will be of the workshop type, under the general chairmanship of HUPP E. OTTO, president of the National Graphic Arts Education Association. In charge of arrangements for the conference are GLEN U. CLEETON, head of the Carnegie department of printing, and STANLEY L. SCHAEFFER, president of the Pittsburgh Printing Teachers Guild.

ALSO meeting in March was the Nebraska Industrial Arts Teachers Association, which met at Lincoln on March 20 and 21. President of the association is OTTO C. OLSEN, Kearney; vice-president, H. H. NEWMAN, North Platte; and secretary-treasurer, G. O. TROGDON, Gering.

THE huge old planer that smoothed the deck plates for the *Monitor*, of Civil War fame, is contributing its part to the present war effort, the fourth war in its lifetime, according to the Production Division of the WPB.

Through the activities of the Production Division, hundreds of old machines are being put to work throughout the country. Many of these machines are so old their age cannot be determined, but they are nevertheless put to work on roughing jobs coming within their low tolerances. Newer precision machines

are thus left for the finishing processes.

ANOTHER March meeting was that of the American Society of Tool Engineers, which convened at St. Louis on March 26 to 28. Representatives from the 52 chapters of the society, which has reached an all-time high of 10,000 members, met at the Hotel Jefferson to consider plans for accelerating and mobilizing the nation's war production, and at the same time conserving the supply of vital materials and tools.

SHOP classes of the Otter Lake, Mich., high school will share with the school band a new building on the school grounds, soon to be completed. The shop classes are now meeting in the American Legion Hall.

THE Board of Superintendents of New York City schools has asked the Board of Education to define Tottenville High School as an academic-vocational high school. This designation, new to the New York City system, would bring the school within the scope of the Smith-Hughes law.

IN A recent release from Washington, the national office of the Selective Service System calls the attention of local boards to a possible shortage of teachers in the fields of vocational education, industrial arts, and physical education for men, and advises the consideration of deferment of men in these fields in areas where replacement cannot easily be made.

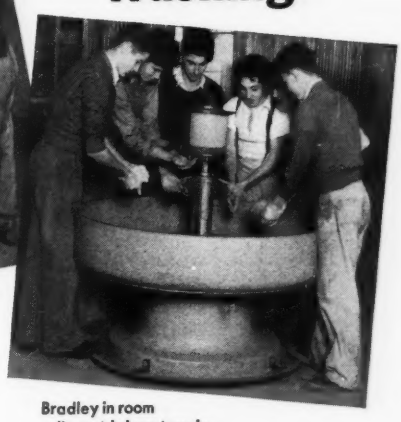
ANNUAL election banquet of Mu Sigma Pi fraternity was held at the Abington Hotel in Detroit, Mich., January 24. Dr. FRANK CODY, Detroit Superintendent of Schools, was toastmaster. Speaker was WALTER F. GRIES, commissioner of the State Social Welfare Commission; guests of honor were DONALD MCGUIRE, principal of Post Intermediate School, and FRAZER CLARK, Principal of Tappan Intermediate School. New officers of the group are: E. G. GARDNER, president; C. H. SECHREST, vice-president; ROBERT SHIELDS, recording secretary; O. R. SCOTT, corresponding secretary; and FRED BRIERLEY, treasurer. ROY HOWARD was elected to the Executive Board.

STATE Teachers College will be host to the tenth annual Pennsylvania Industrial Arts Conference to be held April 24 and 25 at California, Pa. DR. FRANCIS B. HAAS, Pennsylvania State Superintendent of Public Instruction, will speak at the conference, and DR. WILLIAM E. WARNER, professor of education, Ohio State University, will address a luncheon meeting to be held Saturday, April 25. Morning and afternoon sessions will be held, at which defense projects are to be discussed. Arrangements for the conference are being made by a group of industrial arts students and teachers under the chairmanship of DR. L. S. COOVER, director of industrial arts at State Teachers College.

DR. HEBER A. SOTZIN was the principal speaker at the spring conference of the Connecticut Industrial Arts Association, which met at New Britain on March 13 and 14. Both Friday afternoon and Saturday morning were devoted to discussions concerning industrial arts and the war. The Friday evening banquet gathering was addressed by DR. SOTZIN, director of industrial arts, Philadelphia schools, and A. E. FISHLOCKE, resident B.A.G. inspector, United Aircraft Corp. DR. HERBERT D. WELTE welcomed the conference, and greetings were extended by DR. ALONZO G. GRACE, Connecticut Commissioner of Education, and DR. ALBERT N. JORGENSON, president of the University of Connecticut.

Safe, Clean Washing

One of three Bradley Washfountains in shop section McClymonds H. S., Oakland.



Bradley in room adjacent laboratory in Albany, Calif., H. S.

Sanitary Group Wash Fixtures Guard Health of Students

Economical to install and maintain, Bradley Washfountains provide washing facilities that insure maximum sanitation. Eight to 10 may wash simultaneously, each served fresh, clean running water from a central sprayhead. One Bradley takes the place of 8 to 10 single-person wash basins and thus reduces piping connections by 80 to 90 per cent. The generously proportioned deep bowl is self-flushing to eliminate collection of water and possible contamination.

Bradley Washfountains are in use in hundreds of schools, colleges and institutions throughout the country—and are the accepted standard in modern shops of industry . . . Your students deserve sanitary washing fixtures of this kind for health and cleanliness. Bradleys reduce installation and maintenance costs. Being made of precast stone and marble they conserve critical war materials.

ASSISTANCE OFFERED

Bradley Consultants will help you lay out your washrooms for present or new buildings, and a copy of Catalog 4010 will be mailed on request. BRADLEY WASHFOUNTAIN CO., 2285 W. Michigan Street, Milwaukee, Wisconsin.

BRADLEY washfountains

What Do You Think?

What qualifications do you seek in prospective teachers?

▸ Says A. W. BLAKE, Director of Industrial and Adult Education, Fort Smith, Arkansas, Schools:

What do I look for when seeking prospective teachers?

Those who are teaching because they *like* to teach and are not using it as a stepping stone. Men who know their field, but respect other fields of training. Those who organize their work and are seeking new and improved methods of doing their job better. Men who have good college records but have not neglected extra-curricular activities for all-*A* grades. Men who are physically fit and whose habits, personality, and outlook on life make them persons of the type with whom I would want my own son to associate. Those who are taking part in church and community life but whose job comes first. Those who have kept themselves under-paid regardless of their salary.

▸ Says ARCHIE P. NEVINS, Supervisor of Industrial Education, Kalamazoo, Michigan, Schools:

First, of course, is the matter of adequate preparation and proper certification. For industrial subjects, this includes evidence of the individual's skill and ability in his particular field.

With those necessary preliminaries disposed of, I am interested in his personal characteristics. A friendly attitude and attractive personality; good manners, poise, and neat appearance; evidence of a good intelligence and a lively interest in the world around him, and a real interest in people, are some of the important personal characteristics I look for. Then the underlying and motivating philosophy of the prospective teacher is important; he should believe in the value of each individual and have a real regard for the integrity of the personality of each student he meets.

Experience gained outside of schools is a valuable asset. If this experience is industrial employment in his particular field, so much the better, but extra-scholastic living experience gives a viewpoint needed by all teachers.

▸ Says JOHN S. PEARCE, Supervisor, Special Division of Industrial Arts, New Orleans, La., Schools:

In looking for prospective teachers in the Industrial Arts Division of the New Orleans Public Schools, I look for men who can meet the State Department of Education requirements for teachers in the public schools of the state of Louisiana. One of our requirements is that each teacher shall have graduated with a Bachelor of Science Degree in Industrial Arts and Vocational Education, and shall have had his transcript of credits sent to the State Department of Education, and from it shall have received a state teacher's certificate authorizing his employment as a teacher in industrial arts in the public school system of the state of Louisiana.

At the present time, however, owing to the national emergency it is impossible to find men who meet state requirements, so we are taking men who have at least high-school completion credits, and who have had in addition thereto either trade school training or practical experience in the particular field of industrial activity that would give them a sufficient amount of experience on which could be built the pedagogical experience necessary for a teacher. At the present time we have in training a number of men of the latter qualifications who we hope will qualify as teachers for the emergency.

The Orleans Parish School Board is replacing its regular men inducted into the army by the appointment of temporary teachers. These temporary teachers are to serve only until such a time when the regular teachers return for duty.

▸ Says L. H. WOOD, Director of Vocational Education, Sioux City, Iowa, Schools:

I would submit the following as the more important characteristics which I look for when seeking new teachers:

1. Training in a recognized teacher-training college adequately equipped and staffed.
2. A personality that will appeal to boys. A clean-cut individual who can look you in the eye and give clear, direct answers to questions.
3. A man who has had practical experience as a workman. This should be more than just summer work and have been done after high-school graduation.
4. A man who really loves to work with his hands—to tinker about his shop and home.
5. A teacher who can see our work in a proper relationship to the child's whole education to become a selfsupporting member of society.

▸ Says GEORGE C. LODLE, Head of the Industrial Arts Department, Emporia, Kansas, Schools:

Following is my list of qualifications for a teacher:

1. Must have a degree.
2. Have a good character, manners, pleasing personality, and be physically fit.
3. Be able to cooperate with other people.
4. Have a worthy philosophy on education and life.
5. Leadership abilities along with the ability to handle disciplinary problems.
6. Have respect for school property.
7. Show confidence in boys.
8. Be able to work in with the activities of the school.

Attendance Card for Semester Beginning

by **GEORGE W. SCHNEIDER**
Instructor in General Metals
El Monte Union High School
El Monte, California

SHIFTING of students and late arrivals create a problem in most schools at the beginning of a semester. It is quite disconcerting to attempt to keep an efficient roll of attendance until the enrolment becomes stabilized. The card below is an attempt to solve this problem. The cards are filled out (printed) by the student when he enters the class, and filed alphabetically with the cards for that period. The bench and tool check numbers are the same, and since the card is filled out with pencil can be readily rearranged. The attendance record is then transferred to the class record book at the end of the fourth week, and the cards destroyed.

Bench

Last Name First Name

Period College Non-College

Grade Course

Prerequisites

Entered Entered from

M	T	W	T	F	M	T	W	T	F	M	T	W	T	F	M	T	W	T	F

Youth Builds Mexico

by Pierce Shannon

The author of this article is now a technical sergeant at Headquarters, VIII Army Corps, Brownwood, Texas. He writes that he hopes his next letter from SCHOOL SHOP will reach him in Tokyo!

IT'S happening today in Old Monterrey!

The saga of Mexico's century-old battle to snap out of its romantic but painfully slow "rut" is being written with a dramatic climax. It is a story of how a few are teaching a few more, then together they are training still more to take up the torch when they fall.

A few years ago engineers dared to convert winding Indian trails into a highway that linked Mexico City with the United States. Then came the automobile, crowding the ox cart and pack mule caravan off the beaten paths.

These led to other changes. Each year the Mexican citizens beheld new miracles opening before their eyes. A people that had lived in the same sleepy way as had their ancestors centuries before them, found themselves catapulted into a new mode of life.

The irking fact, as far as Mexico was concerned, about the whole affair was that each new bridge that was built, each stream that was bridled to hurl water against giant wheels to turn magical generators that supplied electricity, was conceived, planned, and principally constructed by either an American or English engineer and laborers.

Accordingly in 1935, foreign labor was ruled out of Mexico, leaving the people on their own, to develop or remain as they were.

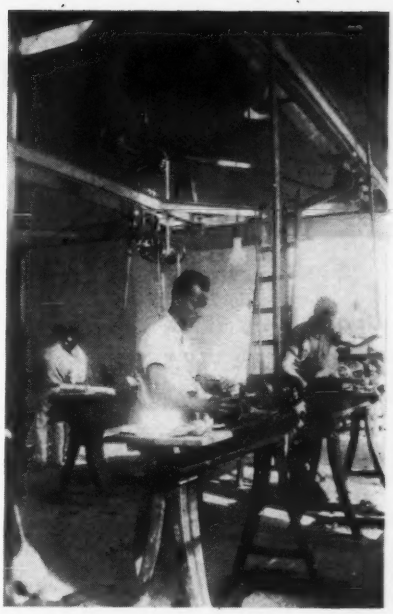
Mexico preferred to continue the development, but soon found that its people were centuries behind the times in labor methods. The native engineers did not have the imagination or initiative to duplicate these nine-day wonders that were taking Mexico from behind the ox cart. And since the days of 1775 when philanthropist Bishop Fray Rafael Jose Verea gave starving Indians jobs constructing the Episcopate on a high hill east of Monterrey, Mexicans have done most of their tasks by hand, priding themselves in the artistic beauty of their product. Take the hammer and chisel away from the Mexican, it was learned, and production stops.

To the city of Monterrey, lying only 150 miles south of Nuevo Laredo on the Rio Grande River, fell the lot of conducting an experiment on how best to solve this labor problem. The Alvaro Obregon Industrial School was the answer.

Founded in 1928, the school is housed in a large stucco building constructed in true Mexican style with a big patio in the center. The enrolment consists of about 500 boys each year.

I visited the school in the afternoon, arriving just as classes were resumed after the traditional siesta—2 o'clock. The principal, himself, a slight little fellow with a bristling mustache and wearing weather-beaten and unmatched coat and pants, showed me through the workshops and classrooms.

Modern shops are provided by the government wherein are taught woodwork, auto mechanics, radio, machine shop, blacksmithing, and other trades. Most of the instructors were young fellows barely older than the students. I was told that they were graduates of the school, and many of them had studied their particular craft in the United States. Teachers are selected for the school, not for their general education, but rather for their mastery of a trade.



This student in the Alvaro Obregon Industrial School, Monterrey, Nueve Leon, is learning to operate one of the machine tools which are playing such a big part in the development of Mexico.

In one wing of the building are classrooms in which the boys are taught mathematics, mechanical drawing, architecture, engineering, and science. The only requirement for entrance to the school is at least six years of elementary school work.

The course of study, covering four years (about eight months each year), is designed to give the student a workable knowledge of different trades and crafts, and a thorough knowledge of the work he selects. The first year he studies mathematics, physics, does a little woodturning and simple carpentry, tears a gasoline motor apart and tries to put it back together again, and learns

(Continued on page 24)

Changing Address?

ARE you moving to another school in your system? Or to a school in another town?

Then please advise SCHOOL SHOP of your correct new address, keeping in mind the following points:

- Give your school address.
- Include the specific subject you teach, e.g., woodworking, drafting, etc.
- Give your old address, without fail.
- Address your notice to

circulation department SCHOOL SHOP

Box 100, Ann Arbor, Michigan

Have You Seen X-acto . . .

the INTERCHANGEABLE KNIFE

X-ACTO is different than ordinary knives . . . the blade is interchangeable. Handles furnished with 8 varied shapes for various uses. Extra blades attractively priced for economy. Made of surgeons' steel.

Write for catalog and sample offer.

X-acto Crescent Products Co., Inc.

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440 - 4th Avenue,
New York, N. Y.

instructional resources

Inquiries concerning materials described in these columns may be addressed to SCHOOL SHOP, Box 100, Ann Arbor, Mich., and will be passed on to the proper firm or person.

Books . . .

Lessons in Arc Welding. Cleveland: Lincoln Electric Company. Pp. v + 176. $0.50.

Sixty lessons in all phases of electric welding, organized for instructional purposes from the experience of the Lincoln Welding School operated by the publishers. Preliminary instruction is given on planning the learning of welding, for continual practice, testing and criticism of work, proper apparel, and working positions. Fundamentals and principles of arc welding are discussed, and clear instructions given on the types of welds and the technics of making them. Questions and answers are given for each lesson.

Simple Blueprint Reading with Reference to Welding. Cleveland: Lincoln Electric Company. Pp. 146. $0.50.

This book on blueprint reading is written to acquaint welders and mechanics quickly with the elements of reading working drawings. The presentation is simple and practical, with copious illustrations. Welding symbols are clearly explained for the various types of welding joints, including butt, corner, fillet, and lap. The student may test his knowledge through a list of questions and answers in the book. The book also covers the essentials of general blueprint reading—perspective, projection, and the lettering alphabet.

Procedure Handbook of Arc Welding Design and Practice. Cleveland: Lincoln Electric Company. Pp. x + 1117. $1.50.

A thorough analysis of arc welding design and practice in eight parts: part I deals with methods and equipment; II, with technic of welding; III, procedures, speeds, and costs; IV, weld metal and methods of testing; V, weldability of metals; VI, welded steel construction, machine design; VII, designing of arc-welded structures; and VIII, typical applications of arc welding in manufacturing, construction, and maintenance. Completely illustrated; special section on reference data; index.

Student Planning Book for Industrial Arts. Baysinger and Silvius. Scranton: International Textbook Co., 1941. Pp. 47. $0.25.

"*The Student Planning Book* . . . presents a practical approach to the teacher's problem of setting up and supervising a student-directed situation," says Earl L. Bedell, director of vocational education in the Detroit schools, in an introduction to this workbook. Duties of the class superintendent, toolman, safety engineer, serviceman, record clerk, and foreman are listed with blank space for the student to fit the book to his own shop situation. Following is material on planning a job and a series of blank pages for planning and sketching jobs and taking notes.

Both Gerald Baysinger and G. Harold Silvius are in the Industrial Arts Department of the Detroit, Michigan, schools.

Aircraft Welding. Elzea. New York: McGraw-Hill Book Co., 1942. Pp. x +171. $2.00.

Covers completely all phases of aircraft welding: chapters on equipment; tools; materials; welds; stress; jigs; construction methods; aluminum and stainless steel welding. In addition, exercises in aircraft welding are provided as are chapters on drawings, prints and tables, and Air Corp specifications.

L. S. Elzea is supervisor of welding, Division of Aircraft Training, Wichita, Kansas, schools.

Shipbuilding Terms. Chicago: American Technical Society, 1942. Pp. 64. $0.50.

The greater part of this wirebound handbook is a glossary of ship terms. Also included are a list of abbreviations for these terms, drawings showing ship terms and locations, and a series of assignment sheets and tests.

The project was under the supervision of Fred C. Williamson, assistant state supervisor of trade and industrial education, Alabama State Department of Education. Cooperating were the Alabama State Department of Education, Mobile Public Schools, Alabama Drydock and Shipbuilding Co., and the U. S. Office of Education.

Lathe Job Training Units. Chicago: American Technical Society, 1942. Pp. 143 $1.35. (Lithoprinted, wirebound).

A series of job sheets in lathe operation ranging from laying out center holes in machine steel to making cast-iron piston rings. With each job are outlines of materials and general instructions, sketches, hints, questions, and references, followed by a job check sheet. At the back of the workbook are hints on blueprint reading, useful tables, references, and a check list of lathe parts.

The book is the product of the staff of Dunwoody Institute, Minneapolis, Minnesota, of which C. A. Prosser is director.

Air Pilot Training. Shields. New York: McGraw-Hill Book Co., 1942. Pp. ix + 602. $3.50.

In four parts: I, theory of flight; II, aircraft engines; III, meteorology; and IV, air navigation. Each of these phases is covered in detail, with excellent illustrations and drawings. Index.

Bert A. Shields is chief instructor in charge of civilian pilot training, Polytechnic Institute of Brooklyn, New York. He is also member of the Institute of Aeronautical Sciences.

Industrial Arts Handbook. Jefferson City: State of Missouri, Department of Education, 1941. Pp. 157. $0.50.

This booklet, one of the Missouri Secondary School Series, outlines the practical arts field completely in four sections: philosophy and objectives; organization and administration; subject matter and method; and shop planning and equipment. Concludes with bibliography, sources of supplies, test examples, etc.

Unit Course in Lathe Work. Albany: New York State Education Department, Bureau of Industrial and Technical Education, 1941. Pp. 164. $1.20 (for single copies). (Lithoprinted).

This suggested unit course in lathe work for beginners in machine shop practice was prepared by the Bureau of Industrial and Technical Education for use in the New York State vocational education program for national defense industries. Series of units are presented for both theory and practice in lathe work between centers, work held in chuck, and use of the grinder. Practice units in working between centers range from drilling center holes between centers to cutting screw threads, and the practice units are paralleled by the theory units. Illustrated with drawings.

The Brown & Sharpe Handbook. Providence: The Brown & Sharpe Mfg. Co., 1938. Pp. 317. $0.75.

This "guide for young machinists" contains material on drawings, use of layout and inspection tools, chipping, filing, benchwork lathe work, drilling, planing, milling and grinding. Other chapters deal with gear and screw cutting, electrical controls, toolmaking, materials, heat treating, and welding. Tables, bibliography, index.

Audel's Machinists and Toolmakers Handybook. Graham. New York: Theo. Audel & Co., 1941. Pp. 1624. $4.00.

In six sections: *A*, machine work (lathes, milling, measuring, etc.); *B*, drawing; *C*, mathematics; *D*, physics; *E*, the slide rule; and *F*, tables. The principal section, on machine work, deals with measuring tools, laying out, materials, and with each of the metal-working machines. First each machine is illustrated and its parts described, after which the author presents actual machining operations. Excellent illustrations and index.

Films . . .

Aluminum Fabricating Processes. Pittsburgh: United States Bureau of Mines. Two reels; 16 or 35 mm. No charge.

A silent two-reel film showing the primary aluminum products and the processes by which they are made. Also describes methods employed in forming and assembling aluminum structures.

(For use of these films address the U. S. Bureau of Mines, 4800 Forbes St., Pittsburgh, Pa. No charge; exhibitor must pay transportation costs.)

Building a Bomber. Washington: Office for Emergency Management.

Two reels, 20 minutes; 16 mm., sound. No charge.

This film describes the step-by-step manufacture and assembly of the B-26 medium bomber, photographed in the Glenn L. Martin plant in Baltimore.

(No charge other than transportation costs is asked for use of this film. For the address of the nearest depository or for other information, address Division of Information, Office for Emergency Management, Washington, D.C.)

Welding. Detroit: The Jam Handy Organization, 1942. Two reels; 16 mm. sound.

From a series of pictures showing the importance of the welder's job, the film introduces the welder's tools and equipment. Correct method of getting the flame is shown, as are the three types of flame. Flat ripples are made on steel sheets to show the way to hold the torch. A bead is welded to show the method of handling the welding rod. Instructions on how to finish the job and put away the equipment conclude the film.

Behind the Shop Drawing. Detroit: The Jam Handy Organization, 1942. Two reels; 16 mm., sound.

The narrator discusses perspective drawing with the pictures illustrating the points made. The method of making the drawing is shown step by step, with animated lines, arrows, and transparent paper so the reason for each line will be easily understood. Drawings of more complicated objects are explained, as are the dimension figures and lines. Scale drawings are shown. The picture finishes with a section devoted to blueprints.

IN THE Morning Mail...

[Brief comments about SCHOOL SHOP *and the field it serves are invited. Address the Editor,* SCHOOL SHOP, *Ann Arbor, Michigan.*

Gentlemen:

Many thanks for including me on your mailing list for your fine publication. It is certainly a magazine well worth reading "from cover to cover." SCHOOL SHOP was an item included in the recent discussions of the Chester County Industrial Arts Teachers Association, and it was interesting to note that not one adverse comment was offered.

JAMES W. WILLIAMS
Tredyffrin-Easttown High School
Berwyn, Pa.

[SCHOOL SHOP is flattered to be the subject of so much attention at industrial education meetings all over the country. Copies of SCHOOL SHOP will be supplied in reasonable number on request to any industrial education organization for distribution and discussion at its meetings.—*Ed.*]

Gentlemen:

. . . SCHOOL SHOP is a most welcome visitor to my shop. The short practical articles are just the sort of help and inspiration we need. Thank you for placing me on your mailing list.

EMIL E. KEILER
Junior High School
Andover Mass.

P.S.—Possibly an article on "Hints and Kinks" in building scale model airplanes would be helpful for the program of building models being instituted by the government in the school shops.

[Thanks, reader Keiler.

P. S.—To assist you and others in carrying forward this government-instituted project, SCHOOL SHOP is carrying elsewhere in this issue details regarding the building of airplane scale models as sponsored by the U. S. Office of Education and the Bureau of Aeronautics of the U. S. Navy.—*Ed.*]

Gentlemen:

The Executive Council of the Associated Guilds of Teachers of Shopwork of New York City have instructed me to convey the thanks of the Council for the copies of SCHOOL SHOP received. They feel that the magazine serves a real need in our field of education.

GERALD FINNERTY, Secretary
Associated Guilds of Teachers of Shopwork
New York, N. Y.

Gentlemen:

I am a graduating student in industrial arts. I had the pleasure recently of reviewing your February issue. I have been informed that all shop teachers receive this book free of charge. If I am not misinformed, will you please send me a copy and place my name on your mailing list?

I am unable at present to inform you in which school I will be placed.

A. MCKAY OGDEN
Fagan, Utah

[SCHOOL SHOP regrets that it must restrict its mailing list to teachers actually engaged in teaching or supervising shop work. To Mr. Ogden and the other students who will soon be entering the teaching field, SCHOOL SHOP requests that they inform us immediately when they are located at a school—they will then begin to receive SCHOOL SHOP regularly.—*Ed.*]

Gentlemen:

I have received my first two copies of SCHOOL SHOP. I wish to thank you very much for placing my name on your mailing list.

SCHOOL SHOP has several features which are very interesting and useful. I especially like the news from the nation's capital. Each month's issue will find me an interested reader.

DAVID N. SANFORD
Morse School
Poughkeepsie, N. Y.

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Silvering Mirrors in the School Shop

*by D. C. Marshall

Paint can be removed from the back of an old mirror with varnish remover and a putty knife or stick.

RE-SILVERING mirrors in the school shop is one way of teaching boys how to make spending money and it might be the beginning of a future business career. It also involves applications of simple chemical and physical principles.

The equipment is so inexpensive that any school can afford it and the process is so simple that anyone can learn it. The equipment consists of a few bottles or fruit jars, a medicine dropper, a flat board for a table top, and a piece of oil cloth.

The preparation of the solutions can be done in the shop.

Solution No. 1 is made as follows:

Dissolve 153 grains of silver nitrate in 1½ ounces of distilled water. Now take stronger ammonia, which is obtained at a drug store, and add it to the solution, drop by drop, with the medicine dropper. At first, the solution will cloud up like muddy water, but as more ammonia is added, it commences to clear up. Keep stirring the solution to distribute the ammonia and do not add more than is necessary to clear the solution of all color. The second part of this solution is prepared by dissolving 125 grains of silver nitrate in ½ pint of distilled water. When completely dissolved, pour the two solutions together in a large bottle and add enough distilled water to make 2 quarts.

For the second solution, take 48 grains of Rochelle salts and dissolve them in 1 quart of distilled water and bring it to a boiling temperature. Next, dissolve an equal amount of silver nitrate in 2 or 3 ounces of distilled water and add it to the solution of salts and boil the mixture for ten minutes. After it has cooled, filter out the precipitate until it is clear and add enough distilled water to make one quart.

The first silvering job should be a small glass; preferably a new glass that will make a mirror. Wash the glass with warm water; then sponge it off with a swab dipped in nitric acid. Wash off the acid with water and sponge the glass with ammonia. Finally, wash the glass with a strong solution of washing soda, then with clear water, and finally with distilled water. Be careful not to touch the side to be silvered with the fingers but handle the glass by the edges. Cleanliness is absolutely essential for a satisfactory job.

While the glass is being prepared, have a student place the board on a bench top that is level and place the oil cloth over it. Make a tray that will

A tray is made to fit the glass by placing sticks around it under the oil cloth.

fit the glass by placing sticks under the oil cloth. Have the tray ready as soon as the glass has been given the final washing and cover it immediately with equal parts of the two solutions. The amount used is 8 ounces to the square foot of glass. In a very few moments, the solution on the glass will begin to darken and the silver precipitates out and forms a coating on the glass. Rock the tray gently so that if a particle of dust gets on the glass, it will be moved about and thus not cause a pin hole in the coating. The precipitation will require from 20 to 40 minutes and then the solution is drained off. If the glass is not well coated, a second application of a fresh solution should be made.

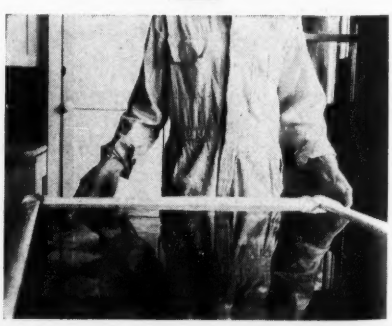
When the glass has been silvered, remove it from the tray and flow a gentle stream of water over it to remove any sediment and then set it on end to dry. When the coating is dry, it must be painted. The paint is made of 8 ounces of turpentine asphaltum, 2 ounces of varnish, a little white lead, and enough turpentine to thin it to brushing consistency. It should be flowed on with a soft brush that will not scratch the silver coating. When the paint is dry, the front of the glass must be polished. Some silver will have deposited on the front from solution that crept under the glass but this can be removed with a swab dipped in ammonia. Give the final polishing with glass cleaner or jeweler's rouge and an ammonia wash.

In resilvering old mirrors, there are two kinds of coatings to be removed. The mercury coatings on very old mirrors are removed with a soft wood stick and a final swabbing with nitric acid. The kind described here must have the paint removed with varnish remover such as is used on furniture and then the silver can be dissolved with nitric acid.

All utensils should be glass or enamel ware. The distilled water that is used for washing can be filtered and used over and over. Rain water can be used in place of distilled water if it is filtered first. The first and most important requisite for a good mirror is a clean glass. Finger prints, a slight trace of grease, or any other foreign substance will cause a spoiled job. It takes only a small amount of material to silver a glass and the profit on the job makes it worth learning, as there are very few places in the country where one can get a re-silvering job done.

This project is different from the usual school shop endeavor which should make it attractive to teachers with imagination. It offers an opportunity to correlate shop work with chemistry. D. C. Marshall has been a teacher of industrial arts in the Manhattan, Kansas, Junior High School for many years.

With an oil-cloth tray, there is no possibility of the solution running off the glass. The solution has begun to precipitate and is turning dark.



NEWS FROM industry

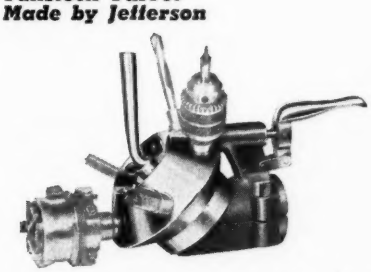
For items listed in this column, readers may address the firm named or write to News from Industry Dept., SCHOOL SHOP, Box 100, Ann Arbor, Michigan.

South Bend Lathe Gets Navy "E" Award

Outstanding performance in production of ordnance material for the U. S. Navy has won the Navy "E" for the South Bend Lathe Works, South Bend, Ind. South Bend has consistently been "ahead of schedule" in shipments of lathes to the Navy and its contractors.

Formal presentation of the "E" pennant and the Navy Ordnance Flag took place February 3 before the entire plant personnel of the company in South Bend. Present from the Navy were Rear Admiral Henry V. Butler, U.S.N., retired; Capt. Henry P. Burnett, U.S.N., Lt. L. F. Brozo, U.S.N.R.; and Ensign John T. Barnett, U.S.N.R. The company was represented by John J. O'Brien, chairman of the board, and R. E. Frushour, president.

Tailstock Turret Made by Jefferson



Any standard engine lathe may be converted into a turret lathe by the use of a tailstock turret marketed by Jefferson Machine Tool Co., Fourth and Cutter Sts., Cincinnati. The turret, which can be attached in 15 seconds to the lathe tailstock, has five tool sockets, which can be rotated to operating position by a convenient hand lever. Complete description of this turret, and its accompanying tool-post turret, will be supplied without charge.

New Manual on Tungsten Carbide Tools

Instructional material covering virtually every factor connected with the use of tungsten carbide tools has been gathered into a single manual just published by the Carboloy Co., Inc., of 11173 East 8 Mile Road, Detroit, Mich. Much of this material has not been published previously.

Not only does the manual cover the design of carbide tools themselves—the selection of tool shapes, tip and shank sizes, relief angles, etc.—but it also covers such related items as design and setting of tool holders, machine recommendations, tool holder screws, and correct methods of using coolants.

The manual contains complete charts of recommended feeds, speeds, tool angles, and depth of cut for various metals. Complete instructions are given for torch brazing technic and for grinding of tools, especially the design and grinding of chip-breakers. Other material includes making of special tools from standard blanks, "do's and don't's" in using tools, and tool control in the shop.

Plomb Tool Company Issues New Catalog

More than 1200 kinds of forged hand tools are listed in the new 1942 catalog of Plomb Tool Co., 2209 Santa Fe Ave., Los Angeles. The 116-page catalog, lithographed in three colors, features large and detailed illustrations of all items in the Plomb line. Tool boxes and kits, sockets and attachments, wrenches, screwdrivers, pliers, and all miscellaneous types of mechanics' hand tools are included. The catalog will be mailed without charge on request.

Educational Calendar Published by Continental

A combined calendar and educational course on machine tools and practices has been published by Continental Machines, Inc., Minneapolis, Minn. The calendar, covering the year from March 1942 to March 1943, contains 12 comprehensive lessons on metal working.

New Lubricating Technic Reduces Tool Chatter

A marked development in the use of colloidal graphite for machine tool lubrication is reported since the advent of the defense program, according to Acheson Colloids Corp., Port Huron, Mich.

Long used for "breaking in" new machines, it is only recently that colloidal graphite has been used in actual service lubrication of such equipment on machine beds, ways, cross-slides, gibs, etc.

Increased manufacturing accuracy demanded in war products and increased operating speeds are believed to be primarily responsible for this development. "Graphoid" surfaces are formed by adsorption of the minute graphite particles in "dag" colloidal graphite, thereby producing a "dry" lubricating film which is effective regardless of high loads imposed on the machine.

Electric Scoreboard

(Continued from page 6)

Cold-rolled steel: ½" and 2" round for flanges
Cold-rolled steel: 1¾" x 9"
Aluminum (or other light sheet): 1/16" x 20" x 4'
Drill rod: ¼" x 9'; 1/16" x 1'
Fiber: ½" sq. rod, 2 ft.
Brass screws, 3" x 10 x 32 RH: 24
Iron screws, 1" x 10 x 24 RH: 12
Brass screws & washers, ½" x 8 x 32 RH: 12
Brass screws (for supporting dogs), ¾" x 4 x 40 RH: 6
Brass screws (for drum), ¼" x 4 x 40 RH: 60
Brass screws (for dogs & cams), ½" x 4 x 40 RH: 24
Iron screws (for clock hand), ¼" x 6 x 32: 2
Iron screws, ½" x 8 x 32: 24
Blue wood screws, ¾" x 6 RH: 24
Blue wood screws, ¾" x 8 RH: 24
Brass nuts, 4 x 40: 1 gross
Brass tubing, 3/16" ID: 4'
Celluloid, 50" x 20" x 1/32": 3 sheets
Plywood, 3-ply, 1 side finished: 3 panels, 8' x 4'

Also: Screws, hinges, ¾" white pine, lacquer, paints.

INDUSTRIAL ARTS TEXTBOOK CATALOG

Newest **McKnight** books include **General Plastics** by Raymond Cherry, **General Printing** by Cleeton and Pitkin, **Blueprint Reading, Checking, and Testing** by Steinike. **The McKnight** catalog lists texts and workbooks in all industrial arts fields, as well as tests, etc., for use in connection with the books.

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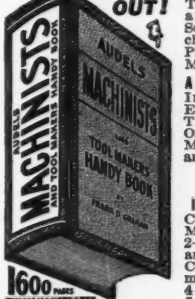

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Washington Letter

AN outstanding contribution of industrial arts teachers and students to the war effort will be the making of 500,000 accurate scale models of Allied and enemy airplanes at the order of United States naval, military, and civilian defense forces. (See article on pages 2-3 in this issue.)

Plans have already been sent to local directors of the project in 43 states and territories, it was recently announced by the U. S. Office of Education, co-sponsor of the project with the Bureau of Aeronautics of the Navy Department.

Model aircraft produced under the project will be perfect scale models of 50 types of planes in use in the war. They will be used by the army and navy for range-finding practice and by the civilian defense corps for identification purposes.

▼ The training of workers for war industries and services is the first phase of education to receive attention of the Educational Policies Commission in its recent publication, *A War Policy for American Schools.* The Commission urges continuation and expansion of federal aid to vocational training in the states to meet the demand for workers created by industrial expansion, transfer of workers to the armed forces, and the conversion to war-time economy.

Industrial arts, too, has its duty in connection with the war effort, according to the Commission. Training of students is advocated in the care and repair of farm machinery, automobiles, home appliances, and other articles, a shortage of which is likely to occur.

Both vocational and industrial arts courses should be expected to contribute to actual production of goods needed—splints for treatment of fractures and printed matter are examples pointed out to school shops.

The guidance function of vocational education, too, is emphasized, at a time when "dislocations in the normal process of selecting occupations" are likely to be severe.

▼ On February 23, Senator McKellar (Tenn.) introduced Senate Bill No. 2295 "to provide for the termination of the National Youth Administration and the Civilian Conservation Corps." Under the terms of the bill, activities of the NYA and CCC would be extended from June 30 to December 31, 1942, "but only for the purpose of winding up" their affairs. The bill was referred after its second reading to the Senate Committee on Education and Labor.

▼ A new challenge to vocational education appeared in the announcement by the Secretary of War on February 7 that 1942 would see an increase in the Army Air Corps to a force of 2,000,000 men. While the actual distribution of this number between pilots and mechanics was not stated at the time, a week earlier the Navy Department announced a 30,000-a-year pilot-training program through the use of facilities of four large universities.

▼ On the shoulders of the vocational schools has fallen the burden of retraining the workers made idle by the closing down of the automobile and other peacetime industries to fit these men for the big production program planned in carrying on the war. It is estimated that the number of new war workers needed in the increased war-production program will reach 10,000,000 at its peak.

▼ New federal-aid bill, Senate No. S.1313 Substitute, has been introduced in the Senate by Senators Elbert Thomas (Utah) and Lister Hill (Alabama). The bill calls for an appropriation of three hundred million dollars per year, to be spent for general aid for public elementary and secondary schools through the fourteenth year. The money would be allocated to the states on the basis of the number of children 5 to 17 years of age and the amount of personal net income in each state.

Major purpose of this bill is to lessen inequalities in educational opportunity within the several states, permitting each state to develop its own plan for accomplishing this end within its own borders. Minority groups maintaining separate schools would receive their full share of the funds in proportion to their numbers.

▼ Part of WPB's Labor Division is a newly organized National Labor Supply Policy Committee. This committee, composed of six management and six labor members, is responsible for formulating policies governing the wartime mobilization of industrial workers. Chairman of the Committee is Arthur S. Flemming, member of the U. S. Civil Service Commission.

▼ The importance of vocational training for youth is stressed by the American Youth Commission in its newly published report, *Youth and the Future.* In its chapter on education, the Commission states that the schools must place less emphasis on preparation for higher education and devote more attention to the preparation for life of those students who will not be able to go on to college. Specifically, the Commission advocates more vocational training, especially in the twelfth, thirteenth, and fourteenth grades and in terminal junior college curriculums.

Youth Builds Mexico

(Continued from page 19)

the construction and general use of tools. During the second year he follows the same routine, with a more specialized program in a particular trade. During the third and fourth years he works long and hard at his chosen occupation, putting in his spare time in the blueprint room, chemistry laboratory, and other allied places.

Already Monterrey and the state of Nueve Leon are boasting of their skilled workmen. During a recent visit to Monterrey I was surprised to find the city bustling with building activity, and each building was startlingly new in design and structure. Work was being speeded by use of machines.

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what about Your future? . . .

with the defense program and now the war program, industrial education teachers know that their vocational field holds for them opportunities that constitute a long ladder leading to advancement and success.

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"The money I can spend and the time I can give to reading educational magazines is limited and the EDUCATION DIGEST provides me with a collection of leading articles of far greater scope than I could possibly get otherwise." H. P. COLLINS, *Principal, Junior High School No. 1, Trenton, N.J.*